The Electragist

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Vol. 25 No. 2 — Association of Electragists INTERNATIONAL — DECEMBER, 1925

FLOOD X-Ray No. 33

TRADE MARK REG.

The No. 33 window flood-light uses standard 200-watt Mazda lamp, and is supplied with a color frame and four colors—red, blue, green and amber.

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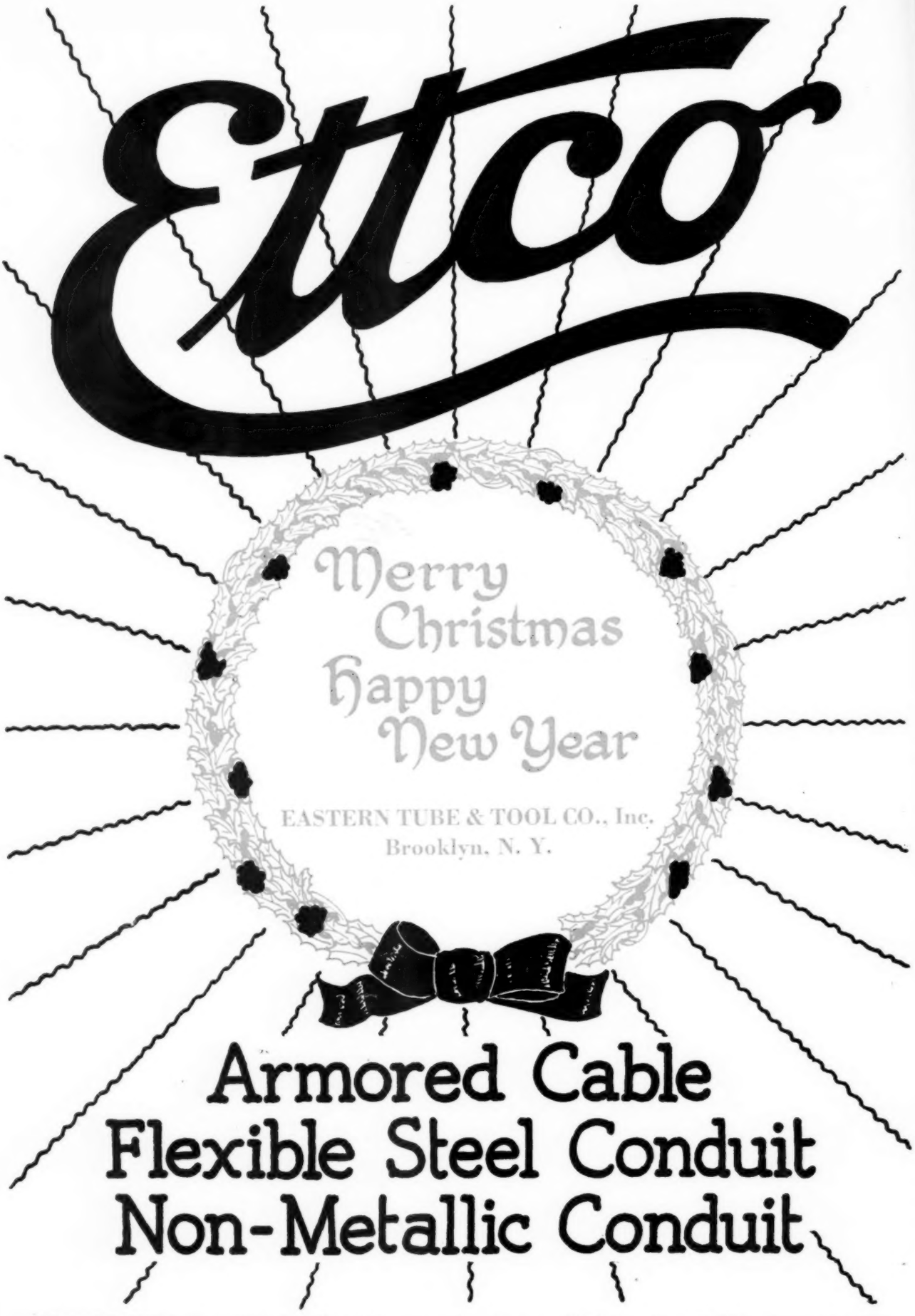

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The Electragist

(The National Electrical Contractor and The Electrical Contractor-Dealer)

Official Journal of the
Association of Electragists—International

Vol. 25 DECEMBER, 1925 No. 2

Making a Place in Today's Industrial Field

Views of Different Successful Industrial Contractors on the Problem of Breaking Into the Wiring and Motor Fields—What One Must Have to Offer and What to Avoid

WHEN a contractor plans to go into the industrial field, he must take a great deal more than energy into it with him. A number of successful contractors outline here what these extra attributes are. Much as their individual thoughts differ in details, they will be seen to dovetail into good practical business sense for the newcomer among industrial contractors.—The Editor.

LITTLE by little there have come encroachments on the electrical contracting business in the industrial field. Factories have set up their own electrical departments in many cases. Then, too, manufacturers and jobbers have frequently gone out of their ways to bypass contractors in the sale of motors.

This condition has naturally raised the question as to whether or not the average contractor is equipped for industrial business. Moreover, there are those who wonder if industrial installation is a business of such complications that it can be handled properly only by specialized contractors.

In order to learn if there is anything of a particular handicap incidental to industrial wiring, a number of electrical contractors, all of whom have achieved a reputation for success, have been interviewed by a representative of THE ELECTRAGIST. The opinions on the subject were unanimous that the contracting door is wide open for anyone who is seeking industrial contracts. On the other hand, those interviewed agreed also that, in entering the industrial field a man must bring more than ordinary qualifications with him. As an illustration, George Weiderman, president of the George Weiderman Electric Company of Brooklyn, reduces industrial qualifications to terms which are both colloquial and brief when he says:

"The contractor who goes out after industrial work must have more stuff to offer than the fellow who is contented with a modest profit along routine wiring and fuse-tinkering lines. Once he enters the industrial game he must begin to do most of his work from the neck up—and that is generally where it pays the most money. Personally, I see no reason why any contractor who has a good fundamental knowledge of the technical end of things shouldn't make a place for himself in the industrial end of things."

Mr. Weiderman's thought is written early into this summary of opinion because it stresses the major contention of all those interviewed. The general feeling is that, unless a contractor can educate himself up to the feeling that he is an engineer and expert, rather than a mechanic, in his line, he will be found blocking his own way in industrial electrical contracting. W. Creighton Peet takes an interesting view on this angle of the question.

"The successful industrial man must keep abreast of the electrical times," Mr. Peet thinks. "He must look out, electrically speaking, far beyond the front door of his shop, even if that shop extends a half-dozen floors above the street level.

"If a contractor fails to keep up-to-the-minute with the progress of the industry through the best of our electrical publications, he is lost in industrial contracting. The best proof of this, if it needs any proof, is the fact that the established, successful, industrial contractor regards the knowledge of every modern electrical development as part of his stock in trade. No owner of a manufacturing plant will pay a contractor for antiquated ideas, and it is ideas, more than anything else, that the industrial contractor must sell. It is well for us all to keep in mind that each new development in electrical science has its relationship to our contracting industry. The man who is only half informed, therefore, is working without a full set of tools."

Industrial contractors all agree that the realization that quality work is imperative within manufacturing plants is each day making it easier for the contractor to approach manufacturers with sound industrial ideas. In this

connection, L. C. MacNutt, of MacNutt, Watts & Tankard, advises the newcomer in the industrial field to prepare for the advantage gained through the expensive self-education which most manufacturers have gone through because they have, at some time or another, intrusted their lighting and installation work to the tender mercies of the "company's mechanic" or the neighborhood electrician.

"Those of us who have been called upon to undo in a hurry some of the crazy-quilt jobs that despairing factory owners have found on their hands know that the 'handyman' and 'lowest-bidder' days are on the wane in industrial work," Mr. MacNutt says.

"Once a manufacturer has been obliged to shut down his factory because of improper electrical work, his future electrical business is there waiting for the industrial contractor, whether he happens to be new or old in the game. Of course, the contractor must be able to adapt himself to different jobs. Factory lighting plans will not fit into a bakery. Moreover, if one deals with a printer it takes a good deal more than a little surface planning to give his print shop its proper lighting.

Owners Practical

"But our printer-owner is practical enough to listen to any plans that are within reasonable reach of his cost estimate of the job, as long as the result will speed up his compositors. The young industrial contractor, therefore, must show a determination to sell the best job only and dispose of price objections through sound technical arguments, the sort that haven't a flaw in them. Remember, it doesn't take long to explain to a manufacturer the difference between group, semi-group, and individual motor drives. Nor, when he does understand, is it necessary to argue motor prices with him as long as you can talk in terms of electric power saved."

An interesting suggestion comes from M. L. Pomares of Austin & Moore, Inc., Long Island City, who maintains that there is no end of industrial business to be gained by building up a community reputation as "the electrical man".

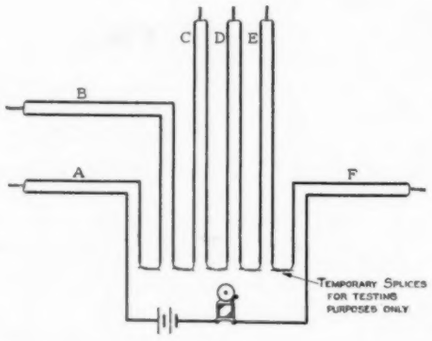
"As soon as a man has established himself in his immediate neighborhood as the person to be looked to when something is wanted in the electrical line, everyone who has an industrial business near him is a prospect. I can point out places where substantial contracts have resulted from prompt attention to a few small repairs that didn't promise very much in the way of profit at the time.

I mention this point to press the fact that the industrial contractor must give service and then more service to get and hold his business. The contractor who hasn't the patience to lead up to the big things through the little jobs had better let industrial work alone. Personally, I consider it casting electrical bread on the water. And you can take it from one who has found it profitable—it generally comes back in the form of good fat contracts."

Saving Time Testing the Bell Work

Much time may be saved in testing the completed wiring for bells in a residence by a simple method which gives a positive indication that the circuits are either all complete, or that there is an open circuit in the group.

Referring to the wiring diagram, pair "A" represents the two wires coming from the front door push button; pair "B" represents the pair coming from the dining room "floor push," pairs "C", "D" and "E" are the pairs dropping down from a point in the kitchen where the bells are to be located, and pair "F" is the rear door push circuit. Note that all the pairs terminate at a point below the bells, which simplifies the wiring, facilitates trouble shooting in the future, and provides a central location for the batteries or transformer as the case may be.



After the wiring is complete, the insulation is stripped from the ends of each conductor. Where the push buttons and bells are to be, these ends are short circuited. The pairs in the basement are then all connected in series with a battery and bell. If the bell rings, it is an indication that all the circuits are complete, if the bell does not ring, it is an indication that one of the pairs is open. The open pair may now easily be found by using a screw driver or knife to short circuit each pair in succession, thus cutting one pair at a time out of the series circuit. As soon as the bell rings, the open pair has been found.

If the circuit tests O. K. on the first test, verify the result by leaving the bell ringing and open each splice momentarily in succession at the push button and bell locations, each such opened splice should cause the bell to cease ringing.

The wiring diagram shows a very simple system, but the method applies to even greater advantage on much larger systems.

Telephone Wiring Pointers

It's the little things that cause trouble in interior telephone wiring. Some simple pointers are given by the S. H. Couch Company as follows:

"For inside wiring in dry places use damp-proof office wire or a dry braid twisted pair or triple conductor and fasten with Blake insulated staples.

"For inside wiring where moisture exists and for outside wiring use twisted pair or twisted triple rubber covered and braided wire.

"For supporting outside wire to building use an iron house bracket having a small porcelain insulator through which the wire can be passed and tied back on itself before entering the building through a hole to be drilled just above the bracket.

"If the entrance hole must be made below the house bracket form a downward loop in the wire to prevent water following the wire into the building.

"The hole in the building should be bushed with a porcelain tube.

"If wire is to be laid underground make a shallow trench and lay in a lead cable of two or three wires and then replace the earth or sod.

"Make sure by a careful test before connecting the wires to the telephones that there is no leak between conductors or between any conductor and the ground."

Large D.-C. Feeder Labor Costs

While Heavy Direct Current Feeder Installations are Somewhat Uncommon, It Is Very Helpful When They Do Arise, to Have Some Labor Data. The Accompanying Cost Record Were Obtained Recently From Such a Job on Which Some Rather Unusual Conditions Were Encountered

By JOHN R. ENGERT
Belmont Electric Company, New York
Chairman, Estimators Group of the Electrical Board of Trade of New York City

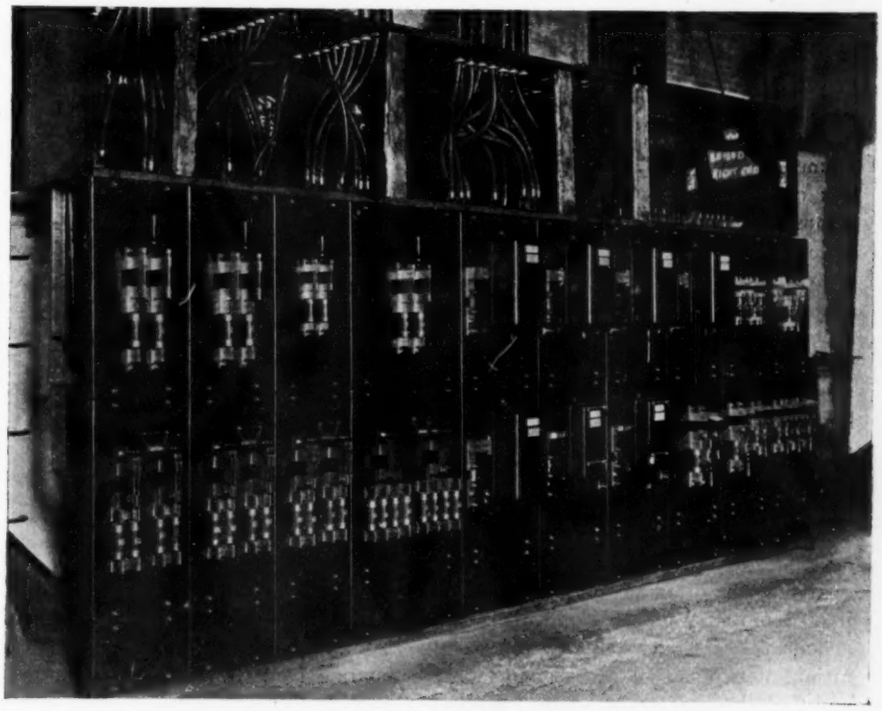
THE contract called for the installation of a service feeder in a commercial building, from the point of entrance of the lighting company's service to a new distribution switchboard, and from this switchboard to run various new feeders to a point where they could be connected to the old feeders originally installed in the building. Previously this building had been supplied from a private plant, which with its original distribution switchboard, was located on the first floor of the building. The new service entered in the basement and from that point on all the work was installed in the basement. The most convenient location for connecting the new house feeders to the original feeders was at a point directly under the original distribution switchboard.

One of the most important requirements about this contract was the necessity for completing it within twenty calendar days after the contract was signed. This period contained 14½ actual working days, the balance being 3 half-days on Saturdays, 3 Sundays and one holiday. It was necessary to make an engineering survey, design the switchboard, place all the material orders as well as perform the actual installation of the work during this period of time. It was impossible to have any interruption of service to the tenants in the building as they were all of a commercial nature, some of them working twenty-four hours a day. Fortunately, however, the one holiday occuring in the period was on a Monday. All the tenants closed down for that week-end period, and as the time of completion had been set on the day after the holiday, it was possible to make the change-over connections from the old feeders to the new ones on this holiday without any interruption of service.

A diagramatic layout of the entire installation is shown in Fig. 1. The changes in the directions of the runs were caused by the necessity for selecting passageways for suspending the feeders as the basement contained numerous brick foundations for generators which had at one time been located in the building.

The new feeders were all installed exposed and suspended from the basement ceiling by means of beam clamps and hangers, as indicated in Fig. 2. This type of hanger appeared to be the best suited. It permitted an unlimited choice in selecting the beams from which to suspend them, although these beams did not run uniform in the floor bays, and since it was, of course, necessary to run the conduits for the feeders in a straight line between elbows and pullboxes. The first operation was to make up these hangers and to clamp them to the I beams on the ceiling. There were in all thirty-five hangers required for the run containing the thirteen 2-in. conduits. The cost of making these hangers and suspending them on ceiling is listed under Item 1 on the cost chart. For the run containing the thirty-two 2-in. conduits there were twenty hangers required and as these hangers contained an additional conduit shelve, the cost was slightly higher. (Item 2)

The next step was to suspend the two pull boxes from the ceiling. Hangers for this work were made up similar to those used for the conduit. The cost of suspending these boxes together with the making of the hangers is listed un-



Distributing Switchboard Connected to Old Feeders

der Items 3 and 4. The work of installing the conduit was then started. It was, of course, only necessary to take one length of conduit after another and screw them together on the hangers. The conduit had been previously cleaned by a helper who was engaged in nothing else but running a die over the thread and carrying the length of conduit to the location where the team installing the conduit was working. In this way the actual cost of installing the conduit (Item 5) was reduced to a minimum. The cutting and threading of conduit nipples (Item 6) was performed in a similar manner, one team being engaged exclusively in the operation and in passing the cut nipple up to the team making the installation. As the ceiling was 18 ft. high, considerable time would have been lost if the wireman had to come down from the scaffold each time to cut a nipple, besides the physical strain on the wireman, as the temperature was at no time less than 102 deg. throughout the basement, due to the presence of high pressure steam lines, most of which were very near the work.

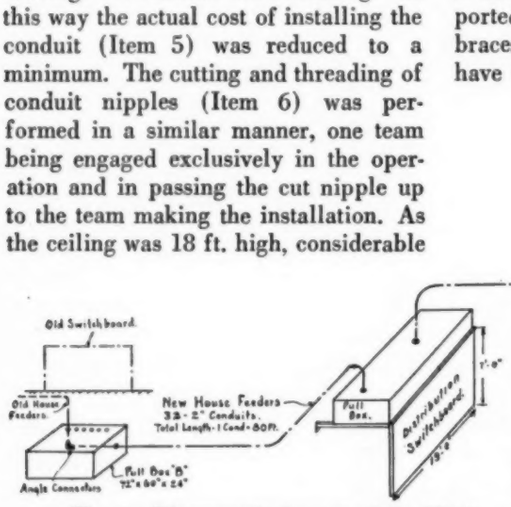
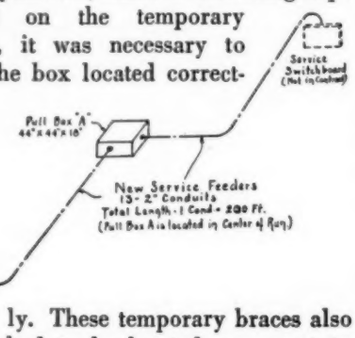


Fig. 1—Diagramatic Layout of the Work

The next logical step should have been the erection of the switchboard framework and the mounting of the pull box over the switchboard, but this was impossible as the manufacturer did not have sufficient time to complete the switchboard. The framework was made up of angle iron and the slate slabs bolted to this, and since it was not practical to ship the framework alone, it was necessary to wait until the entire board was completed before erecting any part of it. The pull box which extended over the entire length of the switchboard was finished, however, and was mounted in its position, supported on temporary braces. This box weighed nearly 3,000 lbs. and the mounting of it on temporary braces was rather hazardous. It was raised into position by means of two sets of blocks and tackle and then the temporary braces installed underneath. The blocks with tackle were securely fastened and were not removed again until the switchboard and the permanent framework had been installed later. The cost of installing this box is listed under Item 7. There were five teams engaged in this operation due to the bulkiness and weight of the box. The box was shipped in sections, and assembled on the floor of the job. Since the conduits were nippled out complete to the pull box, while it was being supported on the temporary braces, it was necessary to have the box located correctly. These temporary braces also had to be located so as not to interfere in any way with the permanent framework.


Service Switchboard
Pull Box "A"
44"x 44"x 18"
New Service Feeders
13 - 2" Conduits
Total Length - 1 Cond - 220 Ft.
(Pull Box A is located in Center of Run)

The mounting of the switchboard pull box practically completed the roughing work, and we were then ready to pull in the cables. Fig. 3 shows the size of cables and the type of insulation. The feeders from the service to the distribution switchboard all had varnished cambric insulation. Cables of the sizes used with this type of insulation usually require over two weeks to manufacture. Fortunately, however, a ten day delivery promise was secured on placing the order. This cable was shipped by special trucks from the factory, located in Bayonne, N. J., direct to the job and was actually being pulled into the conduit two days after leaving the factory. Each length of cable was on a separate reel. It was impossible at the time of placing the order to determine the exact length of each length of cable, as the design of the switchboard had not been finished and it was therefore impossible to determine the exact terminating point of the cable. Accordingly an allowance had to be made at both ends of the cable.

In pulling in these varnished cambric cables, the cable was fed into pull box "A", pulling it first from the service location, then unwinding on the floor the balance on the reel and feeding it into pull box "A" and then pulling from the distribution switchboard location. This entire run of cable was in one piece and due to its large size, considerable care had to be taken in pulling the final slack into the pull box so as not to injure the insulation. There were five teams required for pulling in these cables. The method used was to jack up the reel at pull box "A"; this pull box was approximately 15 ft. above the floor. One wireman was used for unreeling the cable, one wireman and two helpers for feeding the cable into the pull box and three teams with a block and tackle for pulling the cable. Considerable difficulty was experienced in this operation because cable with this type of insulation is very stiff, and also because of the excessive heat near the conduits causing the insulation on the cable to become moist and sticky, which greatly increased the friction necessary to overcome in pulling. It was necessary to keep a constant pull on the cable until the length was completely installed, because if any interruption occured during this operation, the effort necessary to start again was much greater due to so-called "freezing" of the cable. The entire run was also on a horizontal plane and the cable itself weighed considerable. The total cost of pulling this cable is listed under Item 8. The first length of cable together with its preparation for pulling, actually took five teams four hours to pull.

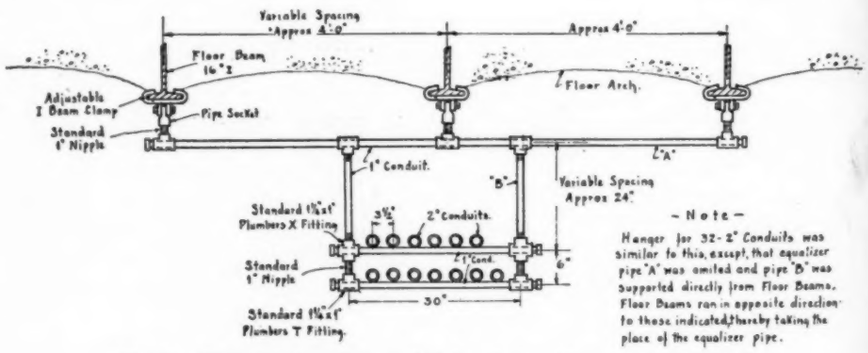

Variable Spacing
Approx 4'-0"
Floor Beam
16"I
Floor Arch.
Adjustable I Beam Clamp
Pipe Socket
Standard 6" Nipple
1" Conduit.
"A"
"B"
Variable Spacing Approx 24"
Standard 1½"x1" Plumbers X Fitting
3½"
2" Conduits.
Standard 1" Nipple
2 1" Cond.
6"
30"
Standard 1½"x1" Plumbers T Fitting
- Note -
Hanger for 32 - 2" Conduits was similar to this, except, that equalizer pipe "A" was omited and pipe "B" was supported directly from Floor Beams. Floor Beams run in opposite direction to those indicated, thereby taking the place of the equalizer pipe.

Fig. 2—New Feeders Suspended by Beam Clamps and Hangers

The house feeders from the distribution switchboard to pull box "B", had rubber insulation, except three of them, and were much easier to install. The cables were fed into pull box "B" and were pulled from the distribution switchboard. Similar means were employed for these cables as were used in pulling the service feeders. The cost of pulling these cables is listed under Item 9.

The next step was to erect the switchboard which had to be completely reassembled on the job. The framework, which was made up of angle iron, was of course the first operation, the upright legs and the wall braces being fastened to the floor and wall by means of lead anchors. The horizontal angles were then bolted on after which came the mounting of the slate slabs on the framework. These slabs were shipped with the switches mounted complete, so that we were then ready for assembling the bus-bar work behind the board. The cables terminated in the pull box above the board and the switch studs on the feeder side were extended up to the pull box by means of copper bars. These bars were held in place in the pull box by a slate slab and the necessary cable lugs were bolted to the bars directly above this slab to which point the cables were brought. The cost of assembling the switchboard and framework is listed under Item 10. Fig. 4 shows a front view of this switchboard.

The operation of soldering the lugs onto the cables was then started. The lugs were practically all of one size.

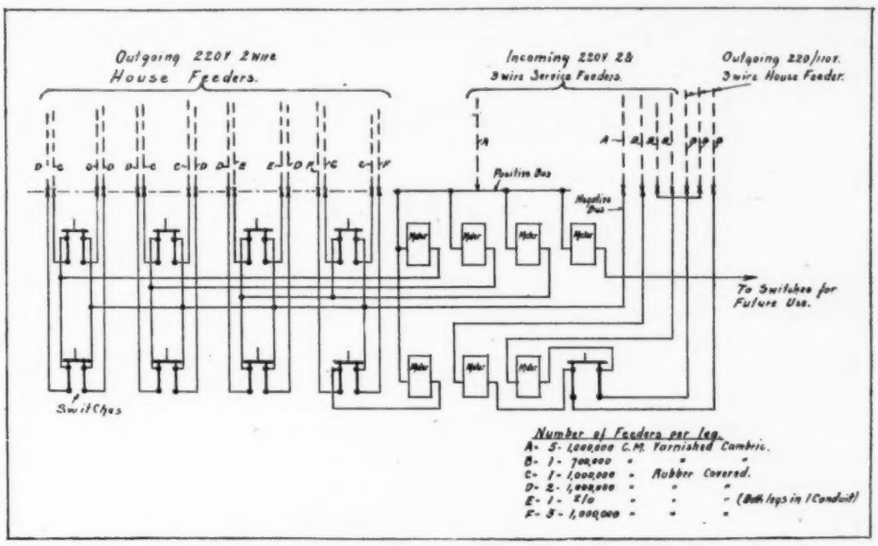

Outgoing 2201 2 Wire House Feeders.
Incoming 2201 2 Wire Service Feeders.
Outgoing 220/110 V. 3 Wire House Feeder.
Positive Bus
Negative Bus
To Switches for Future Use.
Switches
Number of Feeders per leg.
A- 5- 1,000,000 C.M. Varnished Cambric.
B- 1- 700,000 " " "
C- 1- 1,000,000 " Rubber Covered.
D- 2- 1,000,000 " " "
E- 1- 2/0 " " " (Both legs in 1 Conduit)
F- 3- 1,000,000 " " "

Fig. 3—Size of Cables and Type of Insulation

Gasoline stoves were used to heat the ladles for melting the solder. The ends of the cables and the lugs were dipped in this solder until thoroughly heated. After the lug was on the cable and without allowing it to cool, we poured solder into the lug opening, thereby making a good joint and preventing too much of the cable insulation from burning away. The cost of soldering all lugs at the switchboard is listed under Item 11.

Our next and final operation was to disconnect the house feeders from the old private plant switchboard, and to reconnect them to the new feeders which terminates in pull box "B". There was now only one remaining day in which to complete the entire contract, and as previously mentioned, this was a holiday. Work was begun at 8 a. m. and was continued without interruption, except for brief lunch periods, until 7 a. m. the following day, at which time the work was completed and the feeders were then connected to the new source of supply. The connections at pull box "B" between the old house feeders and the new ones were made by means of solderless angle connectors. Considerable difficulty was encountered here, due to the fact that the old house feeders, while rated as 1,000,000 C. M. cable, were of somewhat larger diameter than the present standard, and it was necessary to reduce these to fit into the solderless connectors. It was impossible to make a soldered connection due to the cramped conditions in the box. A number of the old feeders were also found to be too short to meet the point of connection, and it was necessary to lengthen them. The cost of the labor for these connections is listed under Item 12.

This job throughout, from start to finish, received the closest possible supervision, both from a labor standpoint and from a technical viewpoint. The necessary changes and decisions in construction features were anticipated and carried out with a minimum amount of lost time. The labor cost of this job under ordinary conditions, would have been conservatively 25 percent higher, but due to the short length of time available in which to perform this contract, the intensive supervision extended to it was justified. The labor costs given do not include any expense of this supervision, but are only the productive labor costs.

LABOR COST RECORDS ON LARGE D. C. FEEDER INSTALLATION

Item	Quantity		Total Cost in Dollars	Time in Team Hrs.*
1	35	Pipe Hangers for 13-2" Conduits	$153.09	70
2	20	Pipe Hangers for 32-2" Conduits	109.35	50
3	1	Pull Box—44" x 44" x 18"	17.50	8
4	1	Pull Box—72" x 60" x 24"	35.00	16
5	5,000	Conduit 2"	503.01	230
	116	Elbows 2"—90"	126.84	58
6	129	Conduit Nipples 2" (Length to suit)	164.03	75
7	1	Mounting Pull Box over Switchboard	140.00	64
8	2,100	Cable—1,000,000 C. M. Varnished Cambric	245.00	112
	630	Cable— 700,000 C. M. Varnished Cambric		
9	2,350	Cable—1,000,000 C. M. Rubber Covered	175.00	80
	170	Cable— 2/o Rubber Covered		
	250	Cable— 700,000 C. M. Varnished Cambric		
10	1	Assemble and erect Switchboard	105.00	48
11	38	1,000,000 C. M. Lugs soldered at Switchboard	105.00	48
	6	700,000 C. M. Lugs soldered at Switchboard		
	2	2/o Lugs soldered at Switchboard		
12	28	1,000,000 Solderless Connectors at Pull Box "B"	105.00	48
	3	700,000 Solderless Connectors at Pull Box "B"		
	2	2/o Solderless Connectors at Pull Box "B"		
		TOTAL	$1,983.82	907

* A team is composed of a man and a helper.

A Business Guide for the Small Contractor-Dealer

MOST of us, at one time or another, have either given or received individual views of the basic principles under which the contractor-dealer should do business. It has remained, however, for a group of electrical supply jobbers in Los Angeles to present these principles in pamphlet form, as they did at the recent convention of the Southern Division of California Electragists at Lebec. Much in this booklet will not be new to our readers, but in its present form it is logical, consistent, and thorough. Because of the length of this business guide, it will be necessary to publish it in several installments, of which this is the first.—The Editor.

ASSUMING Character, Capacity and Capital in the one first entering into business, perhaps nothing is so important as choice of a proper location. You must give this most careful consideration and make selection with reference to the class of trade you want to secure, the kind of business you intend to do, the volume expected and similar considerations. You must be accessible to your customers and they easily reached by you. The same is true where a concern already in business may find a change in location necessary, if the present one proves unsatisfactory or unprofitable. No one need prove the folly of trying to sell bathing suits to the Esquimaux or fur coats to the South Sea Islanders. No set rule can be given to determine upon a proper location but intelligent, careful consideration from all angles should give you the answer.

Organization

There are six fundamental factors in any business, each following upon the other, but closely related one to the other—

(a) Sales—Volume of business—total selling price of merchandise, service rendered or contract performed.

(b) Cost—What you paid for the merchandise sold, service rendered, or contract performed — what these things cost you.

(c) Gross Profit—The margin of difference between the cost and selling price.

(d) Overhead—The cost or expense of doing business, outside of the cost (b).

(e) Turnover—Rate or number of times you turn the investment you have in the business.

(f) Net Profit (or Net Loss)—What remains (or is deficient) when all is said and done.

The relation of these might be expressed thusly:

Sales—Cost_____Gross Profit
Gross Profit—Overhead
(with Turnover factor__Net Profits

To safeguard all of these factors and maintain them in their proper relation, your organization, be it small or large, must be built. All of these factors, with the exception of Overhead, we will discuss later in other places; Overhead will be treated here:

Overhead

The greatest single factor in the realization of Net Profit, after getting a reasonable, necessary and satisfactory gross profit on your sales, is Overhead Expense. We will not detail what enters into Overhead Expense except to say that generally it is understood to include expenses of every kind and nature but excluding productive labor.

Proportionate overhead expense to the business and its gross profit, careful, never relaxed supervision and control of it, are as vital to a business as heart action to life. One might write a volume giving details, but mere mention and emphasis of its extreme importance will have to suffice here. We might, however, brief these suggestions to insure proper Overhead Expense—

(a) Your organization, whether large or small, should be completely but not overly manned. See that there is enough for everyone to do, and sufficient people to do it extremely well. Idle hands and excess baggage have no claim on business. These are only mill-stones around the neck of business. Every wheel must function properly and there must be no unnecessary wheels.

(b) Set up a proper organization to handle your business in all its phases and see that the organization functions accordingly all the time.

(c) Labor must produce to justify its expense or compensation, and produce to full, expected capacity all the time for which it receives compensation. Lost motion, waiting, loafing, running in circles, duplication of effort, correction of defects or errors, doing messenger or similar work on expensive time or wage—all these things or conditions you must remove or better still keep as barnacles from the hull of business. The untabulated leaks and losses, on which there is no proper check, and on which the finger cannot readily be placed, are, by far, the more dangerous and detrimental. Supervision in every department of your business all the time is the answer and the real insurance policy.

(d) Never allow a condition of excessive or disproportionate overhead to continue for any length of time without proper remedy. It is one thing to find that through excessive overhead you show a loss in one month of, say $500 or any amount, but quite another to have that condition continue through a period of a year, with a loss of $6,000 or similar substantial amount. One month's loss may be recovered and the illness cured, but a year's loss is, for the greatest part, fatal to the ordinary business. Losses reduce or destroy profit. Profit lost may impair capital. Capital, impaired or destroyed, may produce insolvency and business death. Physicians cannot work miracles, neither should business fail to employ proper remedies in time nor depend upon a miracle to save it.

Capital

Character should be a prime quality in any one entering upon a business

career, whether viewed from the angle of ability to secure proper credit or otherwise. Capacity or ability in the line of business chosen is equally important. You can learn a great many things in the school of experience, and you can develop yourself in any given line in that school, but experience, while frequently called the best teacher, is too often an expensive one. Any business is a career or profession and before embarking upon it, the best preparation and equipment are proper knowledge—ability—capacity. The two greatest causes of business mortality are lack of capital and incompetence and they both run neck and neck. We now come to the third essential of Capital.

It is difficult as well as delicate to say what amount of capital a business may require and no one should attempt to lay down a hard and fast rule. The following brief suggestions, however, may serve as a guide and help in answering the question for each individual—

(a) You should have ample capital for the business you plan on doing. While capital may be in different forms, there should be a proportionately substantial *Cash* factor. Generally, in starting a business, the Capital should be all Cash or immediately convertible equivalent.

(b) Your capital, in addition to furnishing the foundation of your business, should be sufficient to handle without trouble all fixed expenses and leave a working margin besides.

(c) It should also be large enough to enable you to handle all your obligations as they mature. A business should finance itself as far as permanent financing goes. The credit you secure from your sources of supply or bank should only be an auxiliary, or help in your business and liquidated in accordance with whatever are the terms of credit. Anything else is permanent financing and to make for a healthy and sound business, permanent financing must come from the business itself, not from sources of credit.

(d) Always hold something in reserve. Do not press resources to the limit. The homely example of the man with a bank account not fearing the rainy day is a sermon in itself.

(e) Develop gradually and arrange your capital accordingly. The proper progression is—Creep—Walk—Run and do all these things in order according to your business strength.

(f) Profits accruing in a sound and successful business furnish additional capital. Losses work the opposite effect.

(g) Discuss frankly with your Jobber the question of necessary capital at the beginning or increase or refinancing later on. He, whose interest is one with yours, will advise you well.

(h) The same suggestion may be offered with reference to your banker.

Accounting System

An Accounting System is the compass of any business. A ship may arrive somewhere without a compass, if extremely lucky, and the destination not too particular, but no sane man should take the hazard. The system selected should be suitable to the business, whether small, medium or large, but there should be one. Any statements here regarding an Accounting System will be general. The system set up for a business must furnish its own particulars and details.

(a) Certain fundamental uniformities always obtain, but each business has its own limitations, problems, organization, class of trade, etc., which require and should receive individual treatment. For all these reasons, and without making criticism or comparison, the preference would be for a special, suitable, adequate system for each business, set up by a competent accountant after a survey and study of the needs of the business.

(b) The system should be practical, economical and adapted to the capacity of the organization.

(c) It should tell the real story—show at all times where the business stands and its trend.

(d) Once set up, its operation must be carried on as long as the business stands.

Just as no one would want to be without the services of a competent physician, when needed, so no business should ever attempt to carry on without an adequate Accounting System. This difference, however, holds: Individuals seek the services of a physician generally when ill, but a business needs an Accounting System to keep it well, or when ill or ailing, quickly to diagnose the trouble and at once to prescribe the remedy. The Chinese method of employing a physician is, after all, the better comparison with an Accounting System for business. Business needs a physician to keep it well.

1. METHOD OF HANDLING ALL CLASSES OF SALES

(a) Cash Sales

(a-1) Modern business practice strongly recommends a Cash Register with proper division or classification to identify kind of merchandise sold—appliances, lamps, supplies, etc., or even the department selling, this, of course, if the size of business warrants; or a register or record of some standard kind. Cash Registers now even perform a great part of the bookkeeping routine. Theft and dishonesty are not the only leaks in business; carelessness and forgetfulness are well up in the procession. Record insurance and intelligent precaution are after all the best protection.

(a-2) Insist that all cash sales go through a register or record.

(a-3) Bond all employees who have access to or handle substantial amounts of cash, or are in a position of trust. Bond insurance is inexpensive, but, like all insurance, its investment is sound judgment. You do not expect dishonesty, fire, burglary, accident or damage, but when any of these come, you have no worry or loss.

(b) Charge Sales

(b-1) The first consideration is credit information. Know that the credit you extend is justified. (See subject 5 in this section for further details).

(b-2) Use numbered tickets for all shipments or deliveries. A register of some kind can prove very suitable also for handling charge sales. It is one thing to conduct a peanut stand alone, but quite another to operate a business with its plurality, of units and details.

(b-3) Periodically audit ticket numbers to account for them and learn their final disposition. Have also a continuous check-off method, carried on by a responsible, trust-worthy party.

(b-4) Insist all charge sales go through a numbered record.

(c) Contracting Sales

(c-1) Here also a first consideration is credit information. Before soliciting or bidding, have proper credit infor-

mation to justify the credit, if successful.

(c-2) Estimating. Nothing in the contracting end is more important and vital to the success of the business than proper estimating. Your bid, based on your estimate, is the selling price of the job and gives you your gross profit out of which any net profit must come. Your estimate must consider the actual cost of the material needed, the actual cost of the labor to do the work, the cost of carrying on your business. All these factors really represent your actual cost. With this determined by a careful, painstaking and as nearly an accurate estimate as possible through some proved, established method, you add a fair, further factor for profit. As everything else considered is cost, you will see what the factor of addition of profit means. Knowledge of all these cost factors is just as important as the profit you add and vice versa. There are several good methods of estimating at your disposal and easy of access. Any method, however, should bear the tested approval of an organization which knows your problems and primarily has at heart your interest. The Electragist method has a great deal to recommend it and merits your serious consideration.

(c-3) Have a definite standard form of contract in writing and signed for every contract job, providing for progress payments and final payment on a specific basis and time. Carry out all your obligations and insist on the other party's performance strictly according to contract.

(c-4) Form A—Appendix—shows a suggested sample form of standard contract.

(c-5) Lien Rights

In the contracting end of the business, certain valuable rights are given by law. These are known by the term "Lien Rights" under which material and labor entering into the construction of a building are considered preferred obligations and to enforce payment of which a lien may be claimed. Your claim of this nature becomes a lien on the building somewhat in the nature of a mortgage.

While lien rights are extremely valuable, you should not lose sight of the fact that a lien does not result automatically in payment, but payment may still be even long delayed. These rights, however, immediately secure and protect, and ultimately bring payment; very often liens for one reason or another effect quick payment. In view of the value of such an insurance policy, you should protect accordingly, always watch carefully, and, when necessary, exercise before too late.

(c-6) Bonded Jobs

The law provides that a bond may be demanded from the contractor by the owner, providing for faithful performance (satisfactory completion at the contract price, according to plans and specifications) and for the full payment of any mechanic's lien which may lawfully be filed against the property. Many jobs now, especially those of any substantial size, are bonded for the payment of labor and material entering into them—this to prevent the trouble, inconvenience and expense that might result from the exercise of lien rights, etc., through the default or failure of contractor to carry out all his obligations. Before submitting your bid, you should determine—

(a) Whether the job is bonded.

(b) If so, exactly to what extent—that is for payment of all labor and material obligations.

(c) The name and address of Bonding Company.

Do all this before you need have recourse to this protection, and make the information a part of your record of the job. You should, however, as in the case of lien rights, remember that bonded jobs do not always automatically pay obligations but may entail delay, expense and trouble. Generally speaking, they afford immediate security and ultimate payment, and as such bonded jobs greatly enhance the credit risk. Your attorney and your Jobber can well advise you on this phase.

(c-7) Maintain a close contact with your Jobber's Credit Man, who will advise you to your best interest and steer you in the right course. Consult with him in time, generally before bidding or committing yourself to a contract. Save trouble and loss, where remedies, after being learned, may be too late.

(c-8) The same suggestion holds for close contact with your bank.

(d) Time Payment Sales

In this part of your business, these suggestions may prove valuable—

(d-1) As a basis for this class of sale, have a form of lease contract or similar legal arrangement which will protect your interest.

(d-2) Make it clear that this contract embodies all and only agreements of the sale.

(d-3) Provide for signature or countersignature by designated officer or principal in the business, without which the contract should not be considered as accepted or binding. It is also advisable to return the customer's copy of contract with a letter, confirming the agreement and verifying the sale. Experience strongly prompts this suggestion.

(d-4) See Appendix — Form D—for suggested form of lease contract. Your financing company or bank may have its own special form for your use.

(d-5) Particularly bond all time payment salesmen; it might be well to bond all salesmen. The cost is comparitively small, the protection insurance very great. As a general rule, you should not want to employ anyone who could not get a bond.

(d-6) Lease contract preferably should be executed in triplicate, one for a financing company or bank with which you should have a connection for handling deferred payment paper, one for your record and one for the customer. No business can properly perform this financing or banking function in carrying its own paper without prejudice to capital which can otherwise be more properly employed or to credit which could easily be impaired or not properly maintained. The cases are rare where funds may be available for this purpose without a detriment to or drag upon the business as a whole, and in these cases the answer is generally borrowing power through a banking connection.

(d-7) Your Jobber can fully advise you on all phases of the Time Payment sale business and will be glad to recommend a proper arrangement to handle it.

(d-8) Your bank can also be of similar help.

The Fibre Underfloor Duct System

A Complete Description of Material, Methods of Laying Ducts and Labor Cost Data Covering Experience in Large Number of Installations

THE rapid extension of electrical service to the individual desks throughout a modern office building makes necessary the provision of adequate wireways when the building is constructed. Picture moldings and specially constructed baseboards have for many years been utilized for this purpose, but only the desks which are placed close to a wall can be served in this manner. Efforts have been made to use standard steel conduit with fixed outlets in the floor at intervals of five or six feet in each direction, but at least four times as many outlets must be provided as will ever be in use at any one time and in consequence the cost of such a system is excessive.

To more adequately meet this condition there have been developed in recent years underfloor duct systems which involve no expense for wiring or outlets until service is required. These systems provide as an integral part of the building construction a network of parallel tunnels spaced a short distance apart which can be tapped at any point so that service can be furnished to any desk, no matter where it may be located.

The underfloor duct system in greatest use is made of fibre and is known as the Orangeburg system. In recent months THE ELECTRAGIST has had a number of inquiries for information on the system and for that reason the following data which has been gathered from a number of sources is presented.

The general layout of a complete system is indicated by the three typical floor plans shown in Fig. 1. The duct lines are run parallel to one another and 5 ft. to 6 ft. apart, and in general are parallel to the building walls. The distance from the wall to the first duct should usually be 2.5 ft. to 3 ft. It is the better practice in most cases to install two separate ducts in each duct line, one for 110-volt service and one for low tension service, though a single duct may be used for both classes of service if this will provide sufficient capacity. The ducts are tied together at intervals by headers connecting with the main lines through junction boxes, these boxes also serving as feeding-in points for the under-floor system. Connections between junction boxes and the high-tension and low-tension cabinets are made by means of steel conduit. When necessary to insure easy fishing, a junction box is installed at a corner; otherwise a corner may be turned by using a large radius cast iron elbow.

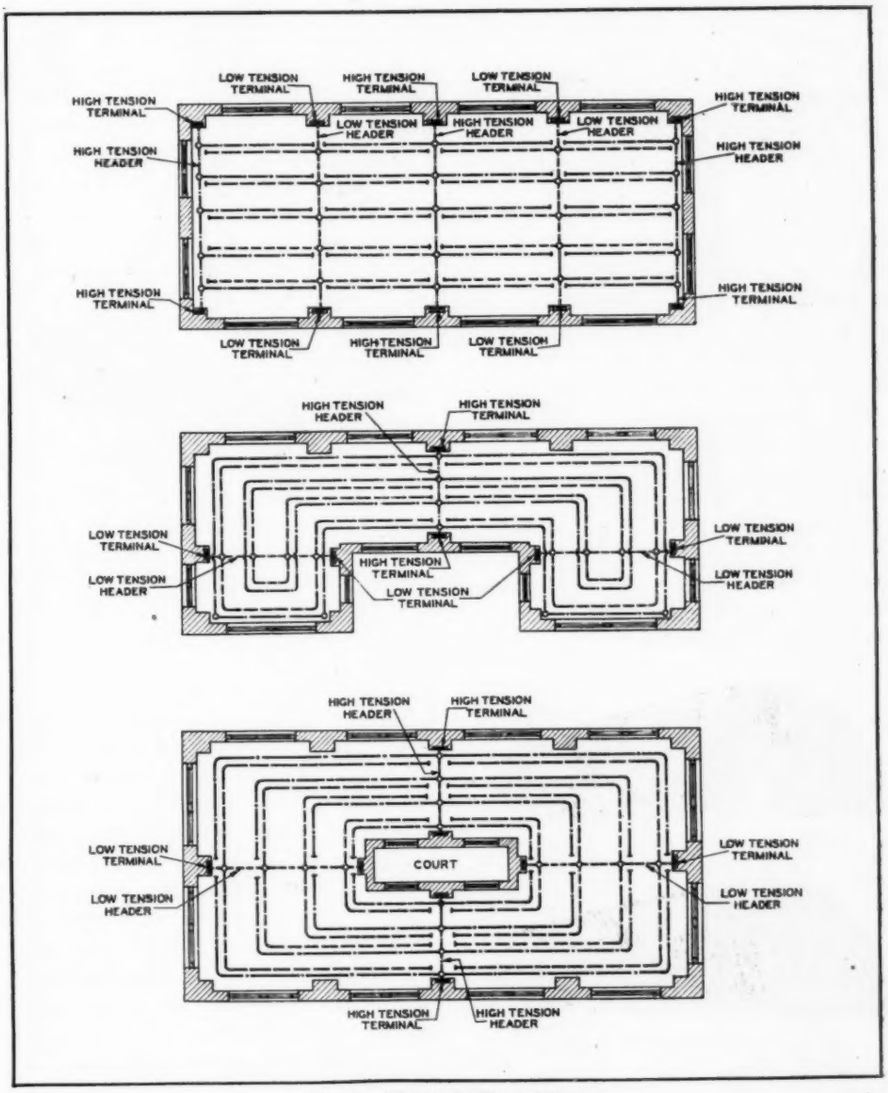


Fig. 1—Typical Floor Plans

Access is had to the duct through an insert or outlet fitting placed through the finished floor and floor covering. Such outlets are only established as

needed, and if subsequently abandoned, are closed in a simple manner, but are immediately available if wanted again.

The fibre duct is the same material as that which has been in common use in underground conduit systems for twenty-five years. Its permanency in any type of floor construction is therefore assured. Two forms are furnished: An open-bottom type (Fig. 2) for use in the floor fill, and a closed-bottom type (Fig. 3) which is designed to be embedded in a concrete floor. The open-bottom type is 4 in. wide by 2 in. high. The closed-bottom type is made in two sizes, 3¾ in. by 1½ in., and 2½ in. by 1 in. These are all inside dimensions. The wall thickness is ¼ in. in all cases. The standard length of the duct is 4½ ft. to 5 ft. and the ends are machined to form socket joints.

The junction box (Fig. 4) is made of cast iron and measures 9 in. by 9 in. The over-all height of the box is 3 in. minimum and 3½ in. maximum, adjustment being obtained by four heavy screws entering the body of the box and supporting the outer flanged collar which in the illustration is shown in place on the box body. Inside of the outer collar is another collar and inside of this is a recessed cover plate, the inner collar and cover plate being secured to the outer collar by four screws. When the box is installed the two collars and cover plate are set to come flush with the finished floor. Then

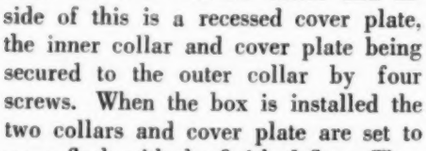


Fig. 2—Open Bottom Duct

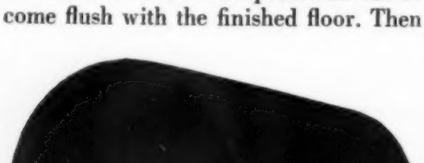


Fig. 3—Closed Bottom Duct

if there is to be no floor covering, the recessed cover is filled with the cement or other material used for surfacing the floor. If at any time the floor is covered with linoleum, a gasket of this material is placed under the inner collar, thus raising this collar and the cover to the exact height required, and a disk of linoleum is cemented into the recess in the cover plate. The collars and cover plate are made of brass.

The box illustrated may be drilled and tapped at each corner to receive 1 in. steel conduit, or a cover plate may be fitted to any duct opening which will permit two 1 in. conduit connections. Another form of junction box is also furnished which is exactly similar to the one described except that one side is left blank and has a capacity for a maximum of four 1¼ in. conduits.

Fig. 5 shows the form and dimensions of the cast iron elbows and Fig. 6 is a crossunder fitting made of cast iron, which is used where it is necessary to carry one duct line across another. Fig. 7 shows the several parts of the inserts used for tapping the ducts at points where outlets are desired.

The more common application of this system is in steel frame buildings having 3½ in. to 4 in. fill on top of the concrete slab or other floor construction. When installed in floors of this type, the open bottom ducts are laid on a smooth-

Fig. 6—Crossunder Fitting

ly finished cement pad, which is 6 in. wide for a single duct or 14 in. wide for two ducts. The pad is of sufficient thickness to bring the top of the duct approximately 1 in. below the finished floor.

After the ducts have been laid they must be anchored to the cement pad to prevent displacement during the progress of the building construction. One contractor who has had considerable experience in the installation of underfloor systems has found that this is best accomplished by applying hot roofing pitch along the sides of the ducts and over the joints. It is found that the pitch forms a strong bond with the cement and fibre so that wheelbarrows may be run over the ducts or they may be stepped on without injury or displacement. This method also seals the duct lines and makes them practically water-tight, which while not absolutely necessary, is a decided advantage.

Other methods of anchoring the ducts which have been tried are trowelling cement along the sides of the ducts and over the joints, inserting tie wires in the cement pad which are later brought over the duct and twisted together, and driving short thick nails into the cement while it is still somewhat soft, on each side of and tangent to the duct. The use of the roofing pitch compares favorably in cost with any of these methods and undoubtedly makes the best job.

Fig. 4—Junction Box

Fig. 8 shows the cement pads in place for three double duct lines and Fig. 9 is a view of the same bay after the ducts were installed. Fig. 10 is a completed installation in which single duct lines were used. Fig. 11 shows how the hot roofing pitch is applied by pouring from an ordinary watering can.

The junction boxes are set on the concrete pad and must of course be accurately leveled and adjusted to the level of the finished floor. The duct is easily cut with a common wood saw. Loss by breakage and waste of short pieces is practically negligible, amounting to ¼ of one percent on one large installation.

When an insert is to be installed, the first operation is to drill a hole about 2 in. in diameter through the floor down to the duct. A hole is then bored in the duct with a special tool used in an ordinary brace. The insert, shown in the

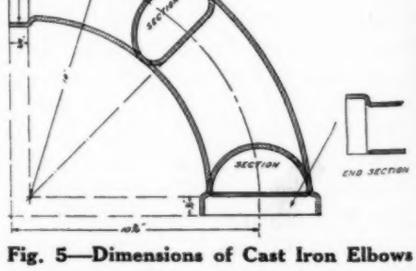


Fig. 5—Dimensions of Cast Iron Elbows

center at the top in Fig. 7, is screwed to the end of a special wrench, and is screwed into the duct until it is flush with the floor, the sharp threads on the insert cutting into the comparatively soft material of the duct. The opening

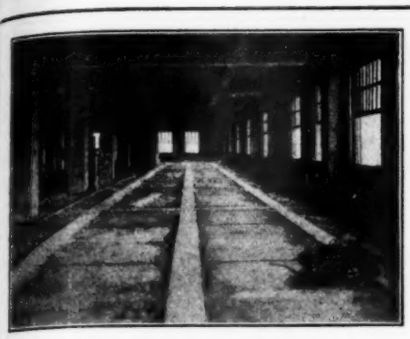


Fig. 8—Cement Pads

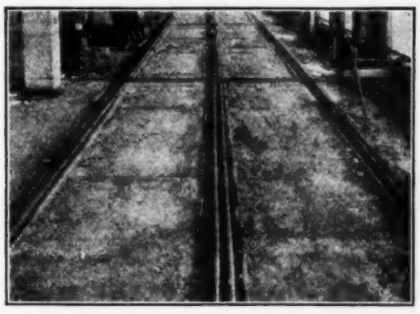


Fig. 9—Bay With Ducts Installed

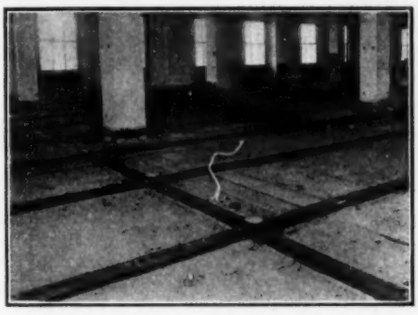


Fig. 10—Completed Installation

in the floor is then patched with cement.

Several forms of fittings are provided in order to adapt the insert to the type of outlet desired: For low-tension outlets the wires may be led out through ½ in. or ¾ in. brass pipe, and for this purpose a ½ in. or ¾ in. reducing bushing is screwed into the insert. For a 110-volt outlet a special clamp fitting grips the end of the armored cable and the wires are led up through a ½ in. brass nipple. If the floor is covered with linoleum the flanged fitting shown at the right in Fig. 7 is screwed into the insert and the lead-out nipple is screwed to this fitting. Suitable outlet heads for either low or high tension outlets are stock articles obtainable from a manufacturer who specializes in fittings of this kind. If at any time the outlet is no longer required the insert is closed with the flush brass plug shown at the left in Fig. 7.

The low-tension wiring in the duct system may be rubber insulated twisted pair telephone wire, No. 16 or No. 18 rubber insulated fixture wire, or lead-covered telephone cable if a large number of conductors is required. Wiring for 110-volt service must be done with armored cable.

Labor Data

The following labor data is furnished by a contracting organization which has had a large amount of experience in the installation of underfloor duct systems and the figures may therefore be considered very reliable:

Fibre duct—9 man-hours per 100 ft.
Junction boxes—0.9 man-hour each.
Wall elbows—0.9 man-hour each.
Inserts in fibre duct—0.67 man-hour each.

The cement pads on which the open-bottom duct is laid are commonly furnished by the cement finishing contractor. The usual charge for this work in New York City and vicinity at the present time is about 10 cents per lineal foot for a pad 6 in. wide for a single duct, or 15 cents per lineal foot for a pad 14 in. wide for two ducts.

When the type of floor construction is such that there is no fill on top of the supporting floor structure the closed-bottom duct may be built into the concrete slab. In such construction the ducts must of course be very securely supported and anchored in position at every joint. When the floor is a plain reinforced concrete slab, the ducts may be supported on saddles made of strap iron, about 2 in. by ⅛ in. with holes punched for nailing to the wood form and for tie-wires to hold the duct in place. Similar supports will also be required for the junction boxes. In tile and concrete joist or steel pan floor construction the method of supporting the duct and boxes will naturally have to be worked out to meet the conditions found in any particular case.

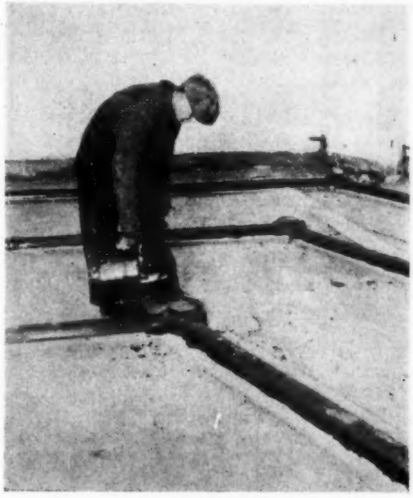


Fig. 11—Applying Pitch

The closed-bottom duct is preferred by some engineers for installation in the floor fill. The installation methods in this case are not essentially different from those described for the open-bottom type.

The manufacturers who have developed the fibre underfloor duct system also furnish drawn steel ducts of rectangular cross-section in two sizes, 1½ in. by 1½ in. and 1¼ in. by 3 in. The principal application of the steel duct is in floors without fill where the ducts must be embedded in concrete, and where the floor structure might be weakened by the somewhat large fiber ducts. The steel duct may also be laid in the floor fill, though the manufacturers feel that fibre is a superior material for such use, because there is a possibility that the steel may be attacked by sulphur compounds which may be present in cinders. A complete line of junction boxes and inserts are made for use with the steel duct system. The insert is similar to that used with the fibre duct, except that it is made of soft brass so formed that by means of a special expanding tool it may be rigidly locked into a hole cut in the duct.

Every electrical contractor who has handled office building wiring knows that the common type of installation without any underfloor duct system is incomplete and entirely inadequate, and for that reason the demand for such systems is growing rapidly, especially for use in buildings to be used by the owners. To date over fifty installations of the fibre underfloor duct system have been made.

Fig. 7—Parts of Inserts

Method for Computing Individual Job Overhead

IN THE June number of the ELECTRAGIST one of the features dealt with a method for computing individual job overhead. The data was presented at the time as a practical plan for arriving at approximately the correct percentage for overhead to be added when figuring the selling price of jobs.

An application of this method was recently made in the case of a contractor who had made it a practice to add 40 per cent to the labor and material cost to cover overhead. He usually found that it worked out for a profit of 10 to 15 per cent on jobs up to $8,000. The contractor was not quite so sure, however, how his plan would work out for larger jobs,—say up to $30,000 or possibly up to $100,000. The use of the chart and table, as shown on this page, brought out some interesting results.

Assuming the annual volume of business to be about $150,000, as it was in his case, and that the average overhead figured as a percentage of the prime cost or cost of labor and material is 25 per cent, the business would take the index letter E in the table. Then, referring to the chart for a job on which the prime cost, that is, cost of labor and material is $8,000, a straight line drawn from the point E to the $8,000 point indicates an overhead of 17 per cent.

TOTAL ANNUAL SALES							
$25,000	$40,000	$60,000	$100,000	$150,000	$200,000	$300,000	Index Letter
Average Overhead Percentage of Prime Cost							
					14	14	A
			18	17	17	16	B
	24	22	21	20	19	18	C
28	26	25	23	22	21	21	D
31	29	28	26	25	24	23	E
34	32	31	28	27	26	25	F
37	35	33	31	30	29	28	G
41	38	36	34	32	31	30	H
44	41	39	36	34	33	32	J
47	44	42	39	37	36		K

Now, if we assume the $8,000 to be the selling price of the job and that the 15 per cent net profit the contractor refers to is 15 per cent of the selling price, we have the following figures:

Prime Cost	$5,720
Net Profit 15% on $8,000	1,200
Overhead	1,080
Selling Price	$8,000

A line drawn on the chart from the point E to a point representing the prime cost of $5,700 indicates an overhead percentage of 18 per cent. Moreover, 18 per cent of the prime cost of $5,720 is $1,030, which is reasonably close to the figure found above of $1,080 and the chart would therefore seem to check out quite closely with the contractor's estimate.

Instead, however, of adding a fixed percentage for all jobs up to $8,000 it would certainly be more nearly right for one to use a variable percentage for the overhead, depending upon the size of the job, as would be indicated by the chart. For example, if the prime cost of a job were estimated as $100 we would add 34 per cent to this for overhead, while if the prime cost happened to be $1,000 we would add 25 per cent.

The chart includes jobs only up to $30,000 prime cost, at which point the overhead would be approximately 14.7 per cent for the contractor whose business takes the index letter E. The overhead decreases very slowly from this point on as the size of the job increases. The figure would be 13 per cent on a prime cost of $100,000 so there will be no great difficulty in estimating what the percentage should be at any given figure for the prime cost between $30,000 and $100,000.

As to the amount to be added for profit, after one has arrived at the total cost, including overhead, this must be determined entirely by the particular conditions. In general, the net profit secured is less as the size of the job increases. By many contractors 5 per cent would be considered a satisfactory net profit on a $100,000 job, although most contractors would want at least 10 per cent on a $25,000 job. This item, however, must always depend upon competition, as well as the contractor's opportunity and ability to sell the job on a quality and service basis, rather than on a price basis.

Phone Company Will Do Wiring

In a recent bulletin, The Pacific Telephone and Telegraph Company issued a supplement which provides that that company will install all telephone wiring in buildings. The company claims that, since it is responsible for providing proper service, these responsibilities can be undertaken only as long as it has the right to furnish also the wiring facilities.

These new regulations have already been put into effect by the plant departments of the coast company.

Estimating for Electrical Contractors

Lesson No. 12—Armored Cable and Metal Molding

BY ARTHUR L. ABBOTT
Technical Director, Association of Electragists

HOUSE wiring with armored cable was discussed in Lesson No. 9 in the September issue. This material is also used very extensively for concealed wiring in other buildings of frame interior construction, especially apartment and commercial buildings, and for exposed work.

Apartment Buildings

Armored cable wiring in apartment buildings is very similar to new house work. There is this difference, however, which is of much importance in estimating; the house wiring contractor does a large number of small jobs, and he can easily divide these jobs into classes which are similar as to quantities of material and labor per outlet. Furthermore, the law of average will apply and a small excess cost on one job will be balanced by a saving on some other. Apartment buildings on the other hand are not in any way standardized; in two buildings which are apparently quite similar there may be difference in the building plans or outlet arrangements which will considerably affect the unit costs of the wiring. The jobs are many times larger than house jobs, but there are fewer of them, and the law of averages cannot operate.

In one building containing 48 apartments it was found that the addition of 63 single pole switches for controlling certain outlets would require additional cable amounting to 3500 ft.

For the reasons explained above it is not a safe practice to estimate apartment building wiring by using unit costs including all material and labor for outlets, that is, by the method which was previously explained for house wiring. The following method will be found far more satisfactory.

Lay out the work completely on a set of blue prints. Then take off a complete list of material, scaling the quantities of cable with a rotometer. If the cabinets are in the basement and a riser is carried up for each circuit, or if there is a cabinet in each apartment and armored cable is to be installed for risers to these cabinets, keep the cable for all such risers separate from the remainder, that is, separate from the cable running between the outlets.

Labor is to be figured by means of the unit times in Table 1. Note carefully that the labor per outlet in this table includes an allowance for the cable from the apartment cabinet to the first outlet on a circuit and the cable between outlets. The labor on cable between outlets can be included with the box labor because this is only a small part of the total, and a difference of two or three feet of cable per outlet will not appreciably affect the total labor. Labor on the risers cannot be combined with the box labor but must be figured as a separate item.

It is always worth while to make a complete layout of an apartment house job. This should preferably be in the form of a tracing so that several copies can be made by blue printing. A very satisfactory job can be done by drawing with a pencil on tracing paper, which will require about one-fourth of the time necessary to make a tracing in ink. A considerable saving in the use of material can often be effected by laying the work out carefully and much time will be saved on the job if the workmen are provided with clear and complete working drawings.

The labor units in Table 1 are essentially the same as those previously published for new house work. Theoretically there should be a saving of at least 10 per cent on apartment building work because the individual job is much larger. Whether or not this saving is realized will depend on the class of mechanics employed and the kind of supervision given them. It is advised that the contractor study his cost records carefully and make a deduction from the figures in the table only after his experience proves that a deduction is justified.

Commercial Buildings

Under this heading are included buildings of frame interior construction which are occupied chiefly by retail stores, though the upper stories may be used as offices, show rooms, lodge halls, warehouse space, etc. There is nothing standard about the wiring layouts of these buildings, consequently the feet of cable per outlet may vary within wide limits and it is impossible to combine the cable labor with the box labor as may be done in house and apartment building wiring.

Many of these buildings are one story in height, with an open space between

TABLE 1—ARMORED CABLE WORK—APARTMENT BUILDINGS
STANDARD TIMES

The labor per outlet includes in each case the labor on all cable from a cabinet located in an apartment to the first outlet on each circuit and all cable between outlets. Labor on riser cables must be added as a separate item.

	Hours Each
Ceiling Outlet in unfinished basement	.50
Ceiling or Bracket Outlet above basement or in a finished basement (Conduit Box)	.46
Ceiling or Bracket Outlet above basement or in a finished basement (Cable Box)	.55
Convenience Outlet, not including receptacle	.41
Convenience Outlet, not including receptacle	.50
Single-Pole Switch Outlet, not including switch	.41
3-Way Switch Outlet, not including switch	.47
4-Way Switch Outlet, not including switch	.52
Receptacle for convenience outlet	.25
Single-Pole Switch	.25
3-Way Switch	.41
Making soldered and taped splices at outlets	.11
Cable for risers, per 100 ft.—1.3 Hours	

the ceiling and roof, making it possible to run practically all cable over the ceiling joists without boxing. Also in a building of two or more stories the construction may be such that a large part of the cable can be run parallel to the joists.

It becomes necessary therefore in this class of work to make use of a labor unit for box labor, which includes the time for cutting the cable and attaching it to the box, and two labor units for the cable—hours per 100 ft. for cable so installed that joists must be bored and hours per 100 ft. for cable run parallel to or over joists. These labor units are given in Table 2.

TABLE 2—ARMORED CABLE WORK—COMMERCIAL BUILDINGS
STANDARD TIMES

	Hours
Ceiling or Bracket Outlet using cable box, also switch or convenience outlets, not including switch or receptacle—each	.33
Ceiling or Bracket Outlet using conduit box—each	.42
Cable run through joists at right angles to joists—per 100 ft.	3.3
Cable run parallel to studs or joists or over joists, requiring no boring—per 100 ft.	.6

The labor data in Table 2 is intended to apply to the typical small retail store where the ceilings are high and there are only a small number of outlets per circuit. The wiring on the upper floors of a building of this type should usually be figured by the same method, though if the wiring layout approximates that of a typical apartment building and the cable per outlet does not exceed 16 ft., the labor may be figured according to Table 1.

It is not practicable to describe in detail the method which should be used in estimating armored cable wiring in every possible type of building, but if the estimator will make a careful study of Tables 1 and 2 he should have no difficulty in selecting the proper labor units to use for a building of almost any type.

Exposed Armored Cable Work

The labor data is given in Table 3. Because of the flexibility of the cable, the supporting straps should be not over 2 ft. apart. The cable should also be strapped within a few inches of each termination at an outlet box so that there will be no tendency for it to pull away from the box. Taking into account the lengths at each end of a run which must be stripped for connections at the outlet, very nearly 50 straps will be required per 100 ft. of cable. The cable labor has been based on this figure. It is assumed that when the work is installed on wood, tile or cinder concrete the ordinary pipe strap will be used requiring two fastenings per strap, and that the special straps requiring only one screw will be used on brick or hard concrete. Two screws per outlet box are assumed in all cases.

Metal Molding

There are two distinct types of metal molding on the market at the present time, one consisting of two members, a backing and a capping, and another type which is made in one piece or in two pieces which are not separable. In the installation of the first mentioned type the wires are commonly laid in place in the backing and the cap is then snapped over them. In the case of the one-piece variety the wires must of course be fished in after the molding is installed. The data given here applies to the type which has the removable capping.

The manufacturers of this material provide a special shear for cutting either the back or the cap, and a small punch-press for punching holes in the back for fastening screws. A special tool is also made for bending the molding. Either member of the molding or both together, can be readily cut with a fine-toothed hack-saw (24 teeth per inch) and screw-holes can be drilled with a small hand drill or can be punched with an awl made of good steel and properly sharpened. Most of the work is done on a stepladder, and some of the best mechanics believe that they save time by using these tools instead of traveling down the ladder to the shear or punch and back up the ladder again. Others prefer the punch-press as it makes a cleaner hole, but it seems to be doubtful whether there is any advantage in using the shear. The bending tool is not often used. Ordinarily bends are only made when it is necessary to fit the molding to a curved surface, such as a cove or a round column. Offsets are commonly made when the molding enters a cut-out box, and a "saddle" or double offset is sometimes necessary in order to cross a pipe or other obstruction. Time would no doubt be saved by the use of the bending tool when bending is necessary, but the tool is usually not on the job and some appliance which happens to be at hand is used.

The labor on this material consists of locating the outlet boxes and securing them in place, cutting the backing, attaching it to boxes and fittings and inserting fastening screws, fastening the elbows, tees, etc. in place, cutting the capping, and installing capping and wire. Each outlet box, elbow, tee or cross involves cutting the backing and capping once and attaching the backing twice to the box or fitting. The labor units in Table 4 for boxes and fittings include in each case the time to cut and attach the back and to cut the cap. All time to fasten the backing in place, and to install the wire and capping is included in one figure per 100 ft. of molding. It will be noted that two labor units are given for the labor on the molding. The first figure, for runs averaging 2 ft. or more in length, is to be used in nearly all cases. It sometimes happens that all the molding used in the entire installation must be cut into pieces averaging 1 ft. or less in length; if in such a case it is necessary to fasten each piece to the surface wired over, the labor is considerably increased. It may seem that a sliding scale of labor units should be employed, depending on the average length of run, but from a practical standpoint this would be an unnecessary refinement. When the work

TABLE 3—EXPOSED ARMORED CABLE WORK
STANDARD TIMES

Installed On	Fastenings	Outlet Boxes Hours Each	Cable Hours per 100 ft.
Wood	Nails		2.3
Wood	Wood Screws	.33	3.5
Tile or Cinder Concrete	Rawlplugs	.38	6.0
Brick	Rawlplugs	.41	4.4
Hard Concrete	Rawlplugs	.52	7.0

is installed on wood, the fastenings will of course be wood screws. The table is based on the use of rawlplugs for fastenings in other materials. More time will be required if a fastening device is used which requires the drilling of a larger hole in the concrete or other material.

A special form of lamp receptacle may be obtained having a grooved or tunnelled base which permits the backing to run through the fitting and thus obviates the necessity for cutting the backing at each outlet. The fittings require only one fastening screw, and this passes through the backing which therefore requires no other fastening if the outlets are only a short distance apart. This type of fitting is especially suitable for show window lighting or any other installation where a number of receptacles are to be placed in line on one to two foot centers. Labor data on these devices has not been included in the table, but it is probable that the labor will be approximately 75 percent of the labor on the No. 356 keyless socket, with a rate of 3 hours per 100 ft. for the molding. This type of fitting makes possible the rapid assembling of molding, wire and receptacles in the shop and installation of the complete strip as a unit. This method should effect an additional saving in labor

As in nearly all other kinds of wiring, the only safe method of estimating metal molding work is to lay the work out, take off a complete list of material, and figure the labor on each item. This is always the best method and does not require an excessive amount of time. If the contractor feels it is necessary to make use of a short-cut method for quick figuring, he may make up a complete list of material for a typical job and compute the labor according to Table 4. The labor per outlet found by dividing the total time by the number of outlets will be an accurate figure for a job of this particular type.

Another method which might be used would be to determine the average number of elbows, tees, crosses and other fittings required per 100 ft. of molding on work of a certain type. The labor on these fittings is to be added to the labor on the molding, and the total labor may then be figured by using one unit for the labor per 100 ft. of molding and wire including fittings, and the proper unit for each type of outlet.

In last month's installment attention was called to the necessity of including an allowance for lost time, or non-productive labor, in every estimate. This is particularly important in the case of small jobs because the non-productive time is always such a large part of the total time. An actual record kept by a contractor who does a large amount of small work, is well organized to handle work of this class and operates very efficiently, showed the following results: on thirteen metal molding jobs averaging 3½ hours productive labor each, the non-productive labor was 37 percent of the productive labor.

TABLE 4—STANDARD TIMES FOR INSTALLING NATIONAL METAL MOLDING AND FITTINGS

LABOR IN HOURS PER 100 FT. OF MOLDING AND HOURS PER 100 FITTINGS

	HOURS			
	Installed on			
	Wood or Wood Lath and Plaster	Tile or Cinder Concrete	Brick	Hard Concrete
No. 033 Molding, including wire—				
Average lengths of 2 ft. or over	3.5	4.3	4.9	6.6
Average lengths of 1 ft. or less	6.4	8.4	9.8	14
Elbows—No. 336, No. 337, No. 338, No. 437	12	13	14	15
No. 335 Tees—including soldered joints	35	37	38	41
No. 334 Crosses—including soldered joints	36	38	39	44
Plain Outlets—				
No. 339, No. 341, No. 342 2¾ in. Round Boxes No. 365 4½ in. Canopy Base No. 366 6 in. Canopy Base No. 407 Utility Box No. 439 Single Switch Box No. 440 2-gang Switch Box	27	31	34	43
No. 348 Drop Cord Rosette No. 360 Convenience Outlet No. 356 Keyless Socket No. 400 Receptacle Base No. 430 Fixture Rosette	34	38	41	49
No. 376 Corner Box—including Soldered Joints	44	48	50	60
No. 406 Combination Fitting—no soldered joints included	10	12	13	18

	HOURS
No. 363 and No. 363A Plate and Cover for connection to existing outlet, including soldered joints	34
No. 441 or No. 442 Flush Device Adapter for connection to existing outlet, including soldered joints	32
No. 438 Flush Device Box installed on tile wall, including patching plaster	48
Drop Cord installed on No. 348 Rosette	30
Making Bend or Offset in molding	50
Making Saddle	75
Painting Molding with cold water paint—per 100 ft.	3

The above times cover productive labor only, and an allowance for non-productive labor must always be added. Actual records show that the non-productive labor on small jobs is 35 to 40% of the productive labor.

Denver Contractors Back Up Electragist Trade Policy

The announced trade policy of the Association of Electragists of "Manufacturer through jobber through dealer to consumer" is finding approval in an ever increasing number of local organizations. The Denver Electrical Contractors' Association has come out for the same policy and in its November Bulletin gives as its association purpose the following:

Everything must have a reason for its existence or it can not survive. This is the operation of the first law of Evolution.

To accomplish the best results, each of the various branches must operate efficiently in their respective field—orderly distribution without encroachment. The logical sequence of Manufacturer to Jobber to Dealer to Consumer must be adhered to.

We must support those who support us! We must play the game on the square, giving what we would expect to receive, forgetting the petty jealousies, admitting the other fellow's existence, demanding and getting a profit for our work and doing a job we can point to with pride. These are the things that make life worth while and they are here to do—for me and you. Let us try!

Concluding the Analysis of 1925 Code Changes

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IT is most important that a contractor not only knows the changes made in the National Electrical Code this year but that he also understands why the changes were made and can therefore be sure of his work. It was with this thought in mind that the author compiled these notes. This is the final installment of this series in THE ELECTRAGIST, others having appeared in the September, October and November numbers. Mr. Goeller's notes will shortly be available in booklet form.

—The Editor.

ARTICLE 16
ELECTRICALLY HEATED APPLIANCES

The term "heating appliances" in this section has been consistently changed to "electrically heated appliances."

1601. Exceptions

A. The wording of this paragraph has been changed to cover an explanation of what operating voltages apply under this article which is the reverse of the old wording wherein it stipulated operating voltages that did not come under its application.

1602. General

c. Before "article 6," in the first sentence, there has been added "Section 603," as this section has to do in part with heater cord. Likewise, in the second sentence before "article 6" there has also been added "Section 602" which applies to rubber covered wire used for supplying stationary electrically heated appliances.

d. Conforming to changes in Section 811-2, the wattage of electrically heated appliances has been raised from 1,200 to 1,320 watts and the mention of "10 amperes" is omitted entirely. There has been a very important regulation added in that "electrically heated appliances each of 1,320 watts or less may be grouped on a separate branch circuit only with approved plug receptacles and not with lamp sockets. This separate branch circuit shall be protected by fuses having a rated capacity not greater than 15 amperes." From the foregoing it is evident that branch circuits having connected thereto fixtures are not permitted on such circuits.

e. There were two paragraphs lettered "d" in the 1923 Code, and the second paragraph "d" has been corrected and is now letter "e" as noted. The change of wattage from 1,200 to 1,320, and the omission of "10 amperes" is the same as in paragraph "d." The following phrase after "indicating switch": "located within sight of the appliance and" has been omitted and the term "readily accessible" presumably is considered sufficient to cover the practical conditions met with generally. There has been a consistent addition to the phrase "which disconnects all wires, etc.," as follows: "which disconnects all underground wires, etc."

f. This paragraph has been relettered for the reason as noted in paragraph "e." "Single pole switches" on the individual units, etc., now reads "switches controlling the individual units, etc." The mention of single pole switches presumably might be misleading as multipole switches are permissible when installed in accordance with the Code rules. The mention of the ampere rating of approved attachment plugs or receptacles serving as a switch under this paragraph has been omitted and seems to indicate that approved receptacles of any capacity may serve as a switch.

g. This paragraph letter has been also changed for reason as noted above.

h. The paragraph letter is also changed as above. Also the phrase "stationary heating appliances" has been dropped as being more appropriate to Section 1,603 and in its place "electrically heated appliances" has been added. At the end there has been added "but individual heating elements of such electrically heated appliances shall be fused if they are rated at more than 30 amperes" and is in accordance with Section 811-b concerning the protection of such appliances.

i. Old paragraph "h" has been advanced to "i."

ARTICLE 17
RESISTANCE DEVICES

1701. Construction

b. "Reactive" has been changed to "reactance;" otherwise this paragraph remains unchanged.

ARTICLE 18
STORAGE OR PRIMARY BATTERIES

1802. Special Requirements

b. In this paragraph there has been added a requirement prohibiting varnished cloth or tape insulations on conductors, presumably because they are affected by the fumes generated by the batteries, although where other corrosive vapors exist that do not affect this type of insulation, it may be used if in accordance with Section 501-g.

d. After "corrosion" there has been added "unless suitably protected against attack from acid or acid spray," which presumably recognizes that corrosive metals may be coated with a suitable non- corrosive covering.

ARTICLE 30
CRANES AND HOISTS

c. In the last line of the first sentence which read: "may be protected by a single automatic cutout" the word "automatic" has been omitted presumably because it was misleading and might have been taken to mean the requirement of a type of protection device similar to a circuit breaker and the prohibition of the use of fuses.

ARTICLE 31. ELEVATORS

3102. Wires and Cables

c. In accordance with the errata to the 1923 Code the typographical error

of lettering this paragraph "e" is now corrected; otherwise it remains unchanged.

ARTICLE 32
EXTRA HAZARDOUS LOCATIONS

3201. General

a. This is old paragraph "b" without other change. It will be noted that its revised location is quite appropriate in that its wording naturally leads off this section.

b. Old paragraph "a" is now incorporated intact under this paragraph letter.

The footnotes following, however, have been modified somewhat, thus, a reference to "Service Equipment" has been added, likewise "Fuses and Circuit Breakers," "Switches" and "Resistance Devices" are also new. Under footnote reference "motors and control section," paragraph "b" of Section 1,003 has been omitted of mention, although an additional reference note has been added (i. e.) "Section 1,004," paragraph "b," as being appropriate. "Sockets and Receptacles" now reads: "Lamps and Receptacles" and to this reference note paragraph "i" has been added in the interest of completeness. The reference to externally wired fixtures has been omitted entirely presumably it being sufficiently covered under Lamp Sockets and Receptacles, Section 1,404.

ARTICLE 33. GARAGES

3301. General

b. In the latter part of this paragraph a rather important change has been made which is in accordance with errata to 1923 Code wherein "unpierced fire walls and *fire doors*" has been corrected to read: "unpierced fire walls and *fire resistive floors*" and has quite a different significance. Thus, let us take, for example, the first floor of a garage under which there was a basement. If the floor was not "fire resistive" it is presumed that all electrical work in the basement would have to be installed in accordance with the requirements of this article irrespective of whether the basement was or could be used for housing motor vehicles. In other words, the floor on which a car or cars are housed is a building and all floors below are considered as garages unless there are separate fire walls and fire resisting floors.

ARTICLE 37
RADIO EQUIPMENT

3702. For Receiving Stations Only

g. To permit of approved form of lead in bushings this phrase has been added "or by means of an approved device designed to give equivalent protection."

j. The footnote of the old paragraph regarding fuses has been omitted presumably as superfluous in the light of the wording of the paragraph proper.

k. At the beginning of the second and third sentence "The grounding conductor" has been changed to read: "The *protective* grounding conductor" in accordance with the wording of the first paragraph. In the second sentence regarding the size of the protective grounding conductor an interesting phrase has been added as follows: "Nor have less conductance per unit of length than the lead in conductor," presumably to avoid the loss of protection that might ensue if this portion of the circuit had a higher resistance than the antenna itself.

l. In the second sentence "protective" has been inserted before "grounding conductor" as in paragraph "k."

m. Likewise, as in paragraphs "k" and l" "protective" has been added. In the second paragraph of the footnotes, "*the* grounding conductor" now reads: "*This* grounding conductor"—a slight change that clears up a possible chance of a misunderstanding.

n. The last sentence of this paragraph concerning storage battery leads has been omitted. Otherwise it is without change.

o. This is a new paragraph and is in part the last sentence of old paragraph "n." It should be noted, however, that the circuits from storage batteries shall be protected by fuses or circuit breakers and rated at not more than 15 amp. and also located preferably near the battery.

3703. For Transmitting Stations Only

e. The last sentence concerning the use of suspension type insulation has been omitted. At the end of this paragraph a new requirement has been added concerning lead-in insulators used on stations having an imput into the transmitter of 1,000 watts or less.

f. To the first sentence there has been added a reference similar to that made in paragraph "e" concerning lead-in insulators.

g. Again the mention has been added as in paragraphs "e" and "f" concerning lead-in insulators.

h. There has been inserted the word "protective" in the following locations: before "grounding" at the beginning of the second, fifth and seventh sentences and before "grounds" in the fifth sentence. The addition of this word clearly defines the particular ground being discussed.

i. The word "radio" in "radio-operating grounding conductor" has been omitted presumably as superfluous.

l. In sub-paragraph No. 1 the capacity of the two condensors mentioned has been changed from ½ microfarad to ⅒ microfarad capacity. Sub-paragraph No. 4 has been modified, the word "electrolytic" being omitted presumably as not being consistent with the minimum cell type arrestor mentioned.

ARTICLE 38
SIGNS AND OUTLINE LIGHTING

3802. Material

d. To cover clearly the full intent of this paragraph "accessible approved box or cabinet" now reads: "accessible *weatherproof* box or cabinet." This correction was also noted in the addenda to the 1923 Code.

ARTICLE 39. THEATRES INCLUDING MOTION PICTURE HOUSES

3901. General

c. To provide a larger scope, the paragraph concerning emergency lights has been changed as follows: "all lights in lobbies" now reads: "all lights *necessary to properly illuminated* lobbies."

3904. Stage

j. Following "approved type, in the first sentence, the phrase "insulated from ground" has been omitted which is consistent with the growing practice of grounding all metallic parts of equipment as a protection against a possible difference of potential between such equipment and ground, should the insulation of the wiring or windings break down and contact with the metal parts of equipment, not the electrical portion thereof.

3,905. The error in numbering this section 3,908 has been corrected in accordance with the errata to the 1923 Code; otherwise there is no change.

ARTICLE 40
SMALL ISOLATED PLANTS

4002. Sockets and Receptacles

a. This paragraph has been reworded for clarity, thus, at the begin-

ning the phrase "*standard*" lamp sockets, etc." makes it clear that special sockets and receptacles are not required for this type of work, although they shall be of the 250-volt classification as given in Section 1,404-a. The second sentence provides that "sockets and receptacles of the 250-volt, 250-watt classification shall not be used for currents greater than 3-½ amperes." This is quite different from the old paragraph that states "and shall be rated at not over 3-½ amperes." Thurs, under the new paragraph, it is presumed that currents of greater than 3-½ amperes, but not exceeding 6 amperes could be taken from a socket if it had a rating of 660 watts and was as proscribed in Section 1,404-a and also footnote (a) thereof. There is one difference worthy of note due to the fact that in Section 1,404-a sockets of 220-volt, 250-watt rating are also rated at 2½ amp., although under this rule 3½ amp. are allowed to be taken from a socket of that rating.

4005. Grounding

a. It will be noted that the phrase "the grounding of circuits or equipment" has been changed to read: "The grounding of circuits or frames of engine or generator," presumably for as being more explicit.

ARTICLE 50
SYSTEMS AND VOLTAGES OF OVER 600 VOLTS

5002. Vacuum Tube Systems

a. In the second sentence it will be noted that the phrase "shall be mounted on a slate base" has been changed to "shall be mounted on approved non-combustible non-absorptive insulating bases" and is consistent with the wording and requirements of bases as defined in Section 206-b. This change presumably recognizes also the growing development of other insulating materials for basis that are fast being adopted by the industry.

5003. Wiring

a. The voltage of circuits in or above buildings has been raised from 5,000 volts to 7,500 volts and it will be noted that the wording "wires operating at a potential exceeding 5,000 volts" has been changed to read: "circuits operating at more than 7,500 volts between conductors." This change while permitting of a higher voltage is also more explicit.

b. To the reference concerning shields or casings there has been added: "and when these shields or casings are of metal they shall be grounded," thus logically recognizing that such shields or casings may be of other than metal which would not permit of grounding.

c. It will be noted that to "generator, switching and motor rooms" there has been added "containing apparatus operating at more than 600 volts shall be securely locked, etc." This clause apparently has been added to insure that this paragraph will be correctly interpreted and not applied to such places as described when the voltage is below 600.

d. Following "motor rooms" in the first sentence "all wiring" has been changed to read "all wiring of circuits of more than 600 volts." This change while similar to that made in paragraph "c" has a somewhat different significance. Thus, under its new interpretation, wiring operating at 600 volts or less in conjunction with systems above 600 volts are not required to conform to this section, but presumably apply to all the regulations for wiring 600 volts and under.

5005. Transformers and Apparatus

a. At the end of this sentence the phrase "will do no harm" has been changed to read: "will be unlikely to do harm" and is indeed a logical change when one considers what might be required to literally live up to the wording of the old paragraph.

d. At the beginning, "For" has been added before "oil filled transformers," also the next clause "when not located, etc.," has been changed to read "which are not located, etc." The phrase "shall be enclosed in fireproof vaults, constructed in accordance, etc.," has been changed to read: "Shall *consist* of fireproof vault construction in accordance, etc." There has also been added two new sentences pertaining to transformers for control circuits and it will be noted that these are excluded from the general requirements for oil filled transformers and are "subject to the requirements applying to the equipment with which they are used." These additions clear up the old paragraph which, if it had been too literally interpreted, might have covered a scope beyond its original intention.

e. This is old Section 5,008-a concerning transformers for electric furnaces. It has been worded slightly different to apply to its new location; its sense, however, remains the same.

5008. Static Condensers

As mentioned under changes of Section 5,005 "e," old Section 5,008 has been incorporated thereunder. In order to cover the growing use of static condensers for power factor correction this section has been added to cover their installation and protection. The use of transformers, usually oil filled, allies the regulations of this section very closely to Sections 5,005 and 5,007 covering "Transformers and Apparatus" and "Transformer Vaults," respectively. Paragraph "a" covers the installation of types composed of small units. Paragraph "b" deals with the requirements of single lank units filled with oil, while paragraph "c" covers the installation of types using transformers and the overload protection of same. Attention is called to the phrase "an automatic overload circuit breaker (or other protective device and switch)." In reference to the mention of a switch noted in the bracketed wording it is presumed that where an automatic overload circuit breaker opens all ungrounded wires of the circuit it may serve as a switch as presented in Section 1,204 c, but that in case other automatic protective devices are used that do not provide switching facilities a suitable switch shall be provided.

5009. Service Equipment

a. This is a new section and paragraph designed to cover specifically the use of high voltage primary services which have developed rapidly in recent years. It is interesting to note that in all places other than covered by the exceptions the services "be controlled and protected by an automatic circuit breaker" inferring that the automatic breaker may also serve as the service switch as permitted under Section 1,204 c. Following this it provides that the circuit breakers "shall be of suitable rupturing capacity," thus recognizing the necessity of providing equipment of sufficient rupturing capacity to interrupt heavy currents occasioned by short circuits or other faults especially where such equipment is connected to large generating systems or interconnections that might deliver under short circuit conditions an abnormally large amount of energy which would have to be interrupted and if the equipment was not of sufficient rupturing capacity serious damage might be done to the circuit breaker, property and even life itself. As prescribed in Section 5,003 e, air-

break disconnectors are required on the supply side of all apparatus within the building. The paragraph also covers the use of suitable disconnectors and fuses "If the service does not supply, at the primary voltage, any equipment except that contained in a fireproof transformer vault, or if it enters only a detached transformer house or inclosure" and presumably recognizes that the general hazard is greatly reduced under these circumstances and that the more expensive outlay of automatic circuit breaker can be obviated if desired. In the case of voltages not exceeding 2,300 volts to the ground and the transformer capacity not exceeding "50 k. v. a. per phase suitable fuses without disconnectors may be installed in the transformer enclosure." As the secondary side under these conditions must be provided with "suitable circuit breakers or switches and suitable fuses," the load could thus be cut off the transformers. Should it be desired to disconnect the primary circuit therefrom the primary fuses could be pulled and in doing so would only have to interrupt the magnetizing current of the transformers which, up to the limited size of 50 k. v. a. per phase for this type of installation, would be small. It is also interesting to note that in the last sentence it is inferred that where automatic overload circuit breakers are provided and arranged so that "they may be tripped manually from a readily accessible point outside of the transformer vault or enclosure." In such cases service switches and fuses or automatic overload circuit breakers can be omitted if desired in the secondary side of such services. It is practical to assume that a remote controlled automatic overload circuit breaker might be operated with safety by a person other than an experienced electrician, but in the case where only air-break disconnectors and fuses are used the hazards are greater; thus this second paragraph provides that when the latter are used they "shall be accessible to qualified attendants only."

ARTICLE 60

SIGNAL SYSTEMS

6003. In Buildings; Generally

e. In the second sentence the phrase "and the primary wiring to the requirements of Article 1 to 19, inclusive, of this Code," has been changed to read "and the primary or the charging circuit wiring to the requirements of Article 1 to 19, inclusive, of this Code." The addition of the reference to "the charging circuit wiring" is presumably added to cover that portion of the wiring connected to lighting circuits or similar sources of energy that is connected to equipment designed to reduce the voltage for charging storage batteries or even supplying current of a lower voltage to signal systems.

APPENDIX

This has been omitted entirely.

Watching Overhead Costs

A Western Dealer-Contractor Who Has Had His Downs as Well as His Ups, Tells of Some of the Things That Made Success Come High

By RUEL McDANIEL

OUT in Cheyenne, Wyoming, there is an electrical contractor whose experience ought to serve as an example for a great many other electrical men, wherever they may be. This is true, because the fundamental reasons for success or failure are the same the world over. The fact that Cheyenne is a frontier town, out where there are still touches of the "old west", does not mean that the problems which confront the dealer-contractor out there are any different from those met by the dealer in Portland, Maine, or Hoboken.

This Wyoming dealer's name is F. W. Fitch and he owns the Fitch Electric Company, which is located on Cheyenne's busiest business street. The place is not a large one, but it is amply spacious for the size of the town. And, after all, it is what goes on inside that counts, anyway.

Mr. Fitch bought an electrical shop early in 1920. During nine months of that year under his management, the shop did almost 100 percent more business that the shop did the entire year before. The concern has continued to enjoy a fair increase since. This year the volume will reach nearly $40,000 A little more than 60 percent of this is contracting-wiring, primarily; while the remaining 40 percent comes from merchandise sales. Although the company has enjoyed a normal growth, there have been whole years since 1920 when the company failed to show a profit.

MR. FITCH, out in Cheyenne, had a good deal to learn about the electrical-contractor business in a frontier town before he began to make money. We are inclined to think that the lessons he learned down in a little corner of Wyoming were sound good sense and have a message for contractor-dealers in all parts of the country.

—The Editor.

"In fact" declares Mr. Fitch, "there have been times in these years of apparent plenty when the little business was almost in sight of the rocks, and all because I did not realize that increasing business does not necessarily mean increasing profits. Today, however, regardless of whether or not volume increases, I am making a profit from the business every month. And I am doing so because of some mighty essential things, learned since the Spring of 1920. I profit now by the mistakes of yesterday."

The most important lesson, he points out, is that collections and overhead are the most vital factors in the success or failure of an electrical business. In his early attention to volume he neglected the subject of collections and overhead and it was almost fatal. He has found that the volume of business one does is, after all, less important

than the cost of doing business and the amounts of out-standing accounts carried on the books.

One of the chief troubles in the overhead costs was wastefulness in advertising. Yesterday he was governed too much by the ability of advertising salesmen and not enough in his own judgment, when it came to placing advertising. The total amount of money virtually wasted on advertising during the course of a year, he found was surprisingly large. Today, Mr. Fitch gets more advertising than he did formerly, at a great deal less cost. He has an advertising program that pretty well covers the year, and it must be an unusual circumstance, indeed, to make him deviate from this program.

Volume and Money

"Perhaps, next to overhead, the most important thing I have learned," Mr. Fitch explains, "is that volume really isn't volume, after all, until you get the money. I soon realized that I was entirely too lenient with my outstanding accounts. It does not take many unpaid accounts to eat up profits entirely and I found that it was mighty easy to have a handsome book profit while I was actually losing money.

"Today I am reasonably sure that a person is worthy of credit before he gets it. Certainly it is more profitable to lose a doubtful sale than to make one that cannot be collected. And the accounts that I do have outstanding receive my attention before they get old. By the middle of each month I have a typewritten list of all persons owing the shop money, and the amounts each is behind. I do not stop until I get in touch with each of these persons either by telephone or by a personal call. If a man does not voluntarily send in his check before the fifteenth of the month, he ought to be reminded of it. Timidity breeds failure."

Business Cost Important

Another thing Mr. Fitch has learned in the building of a small-city electrical business is that a man is skating on thin ice when he fails to know his cost of doing business, his volume, the amount of his purchases, and the other details entering into the financing of the shop.

"If I had nothing more than a peanut stand," he declares, "I would have a complete cost-finding system to keep up with it. Today I wonder how I managed to get along at all without knowing my business, financially."

Now, in two minutes Mr. Fitch can sit down at his desk and find his daily, monthly, or yearly volume of business for any period covered by his cost-finding system. He can instantly ascertain what his overhead, for any given period, is, and just what factors contributed to this cost, item by item. He knows his volume of merchandise sales as well as the net and gross profit from them. He knows the same thing for his contracting jobs, individually and collectively. Knowing where he loses money, he easily and quickly remedies the trouble.

"I have learned that it is folly to solicit wiring contracts on a price basis. With my cost-finding system I know what a wiring job is going to cost me, approximately, and I invariably add a reasonable profit to that sum when I bid. I try to secure most of my contracting on a cost and material basis," Mr. Fitch points out. "Another thing that I have found that is important is the method of approach in selling wiring and fixtures. It is up to the individual electrical contractor, everywhere, to co-operate with the various associations in showing the public the folly of buying cheap wiring and fixtures in good homes.

The Same Old Example

"Of course, the following is an old, familiar story, but nevertheless it serves to illustrate the public's thoughtlessness toward electrical needs: Recently I was called into an expensive home to suggest some new fixtures to match a set of furnishings in the new home. On the floor of the living room was a five hundred dollar rug, the windows were draped with material that must have cost three hundred dollars, while the remainder of the furnishings were similarly fine. And yet, the owner of the house thought twenty-five dollars was enough to spend on a fixture to hang above this valuable and beautiful rug!

"Personally, I would not accept such an order, and I did not in this case. I frankly told the owner that I would not take to it, because I knew he wouldn't be satisfied with it. By going into a lot of details about the manufacture of fixtures, their place in the home, and how they must blend with other furnishings if they are to give satisfaction, I sold this customer a seventy-five dollar fixture. Moreover, I believe that we contractor-dealers must get after this ignorance on the part of the public through individual cases before we are going to enjoy the full benefits of the work that associations are doing for us. People simply must have these facts brought home to them, in A-B-C fashion, before they will quit spending a thousand dollars for plumbing only to expect to get their electrical work with left-overs from other less important costs."

Against Bargains

Still another fact he has learned during his ups and downs in building a successful electrical business in a little western city is that it does not usually pay to grab up "bargains" in unheard-of merchandise offered so freely to dealers. Practically the entire stock of the Fitch Electrical Company is now composed of standard, nationally-advertised merchandise, merchandise that stands on its own reputation and sells without undue pressure on the part of the salesman. Mr. Fitch features these nationally known lines in his advertising, in his windows, and on the counters of his store. Only when he needs some novelty to create special interest in the shop does he buy an unknown article. And even then he buys in safe quantities.

Range Wiring Costs

A survey of range wiring costs of different central stations made by the electric range wiring committee of the N. E. L. A. showed wide variations as follows:

Type of Wiring	High	Low	Average
Conduit	$125	$30	$61
Armored Cable	75	25	46
Open	---	--	30

The committee states as "it is generally agreed by those interested in the promotion of electric cooking that one of the outstanding handicaps to range sales is the cost of interior wiring" it feel its chief function is to try to reduce these costs.

Accordingly, it has been developing specifications for a heavy duty range plug switch. It is expected to come to a final agreement on this shortly and then the committee feels there will be no further action necessary for it is expected that wiring costs can then be fairly definitely estimated.

Interior Telephone Work III

Installation Practice

By J. B. LONG

Telephone Sales Engineer, Western Electric Company

(*SYNOPSIS OF PREVIOUS INSTALLMENTS*—Elijah Haskins, a practical electrical contractor, having had some trouble with an interior telephone installation, decided to compile data which would lead him in the right direction the next time he was asked to figure on such a job. He first compiled a tabulation of all the standard classes, their use, advantages and limitations. Next he gathered all the necessary data on wire and cable sizes and the proper size to use with each system for different distances).

THE question then arose of whether to use conduit. Mr. Haskins knew that cable should be run in conduit in fireproof buildings, and of course in all places where it would otherwise be exposed to mechanical injury. In non-fireproof buildings, he found, cable could be run along mouldings or supported by pipe straps of the correct size. There was little advantage, in his opinion, to the use of conduit in old, non-fireproof buildings.

Third, the same survey of the job which would enable him to figure the necessary lengths of cable and wire would give him an idea of the number of porcelain cleats, porcelain bushings, pipe straps, tacks, copper sleeves, and the amount of friction tape and rubber tape needed. Pipe straps or cable clamps for supporting cable should be used about 2 ft. apart. Pipe straps should be examined for sharp edges which might hurt the cable. They should be of the proper size, for if they are too large or too small the installation will consume more time and it will not be neat.

His list of tools was as follows:

TOOLS FOR TELEPHONE WORK

1 pair "longnose" pliers
1 pair sidecutters
1 pair "flats"
1 3½-in. screwdriver
1 6 -in. screwdriver
Brace and bits of different sizes
Blowtorch, solder and soldering iron
Bridle wire—heavy, tar-covered
Fish line and "snake"

Cable terminals and connecting blocks next concerned Mr. Haskins. For the first time in his busy career he took the trouble to compare the different kinds and to figure out just which would be the best to use from the standpoint of saving time and money and giving adequate service. He knew that a terminal or connecting block should be used wherever an outside lead-covered cable is to be connected with an inside cable; wherever a junction is formed between two, three, or four cables; or wherever a branch is taken off a main cable. Not over four cables should be connected to any terminal, for too many wires fastened to a terminal make the connections likely to fail.

A standard type of cable terminal he found to be one which affords a metal cover to protect wires and terminal posts. This he considered to be the best for reliable and quick connection of a number of cables. A simpler means of connection is found in a plain connecting block, without cover, which has simply the terminal posts. This block must be fastened to a board to which the cable is attached by pipe straps.

How Prepared

Having gone this far, the veteran contractor had just about cleared the ground for action; he was ready at this point to begin where on previous occasions he had always started in briskly without a thought of adequate preparation. He was ready to look at a particular installation and decide how to start work.

He determined to do no work until he had definitely determined the best way of proceeding. First, the location of the instruments had to be decided. Then, if cable was to be used as would usually be the case, the best method of running the cable to the instruments had to be fixed.

Instruments should, of course, never be located where they may become damaged by a door or by furniture; never placed in the way of passing persons; over radiators or on damp walls or vibrating partitions; nor should they be placed in noisy locations or near windows which will be open in wet weather; nor in dark places where it will be difficult to find the correct push buttons when someone wants to use the instrument. But all this was perfectly obvious, for it simply involved the use of common sense and good judgment.

Three Methods Possible

There are three general methods of running cable to the instrument. In the first method, the main cable or riser is run from the basement to a terminal box on each floor and from there separate cables to inter-phone instruments.

In the second method, the main cable is run from the basement to a terminal box on each floor; but instead of running separate cables from these to each station, only one cable is used. This one cable makes the circuit of all instruments located on one floor. If more convenient, two cables may be used, each taking in one side of the building. This method, while not requiring as much cable as the others, is somewhat more difficult to install and requires more time.

In the third method, separate cables are run from the terminal box in the basement directly to each station in the system, but not more than four cables from any one box. In case the stations on the various floors are located one above the other it is only necessary to run risers between floors.

Mr. Haskins could see that a modification or combination of the methods described might at times be found more economical, depending on conditions. He listed the following precautions for himself and his assistants to memorize:

Avoid running cable in contact with water or steam pipes.

Don't expose cable to injury.

Don't make cable runs conspicuous.

Don't run cable near electric light or power lines; where a crossing or parallel run is unavoidable there should be a separation of at least six inches. In case of alternating current, even greater separation is necessary.

The colored conductor of a pair of wires in a cable is usually called the line wire, and the other conductor its mate. Avoid splitting a pair of conductors whenever possible to prevent unsatisfactory transmission due to an unbalanced circuit.

The other important considerations to be taken into account, he found to be these: Porcelain tubes should be used as bushings for holes in walls through which cable is to be carried; when wires are brought outside to connect to separate buildings, the cable should either be run underground through pipe or conduit, or suspended from messenger wire which in turn should be securely anchored. An outside run of any length should be grounded against lightning, especially when metal cable hangers are used for holding the cable to the messenger wire. The cable should be bent to form a drip loop just before entering a building, so that rain will drip off at this point instead of leaking into the building.

After having definitely established the route of the cable, it will be necessary to open it properly and fan out the cable wires before connection can be made to the terminals of either interphones, cable terminals or connecting blocks. The following procedure was devised by the contractor as a guide:

The cable should be lined up parallel with the board on which the terminals are mounted, allowing a length of 4 to 6 in. of cable to extend beyond the last terminal. Mark the cable at a point about 1½ to 2 in. before the first terminal. From this mark to the end remove the cable covering.

If the cable has a lead sheath, the latter can be removed by first making a very slight cut around the cable about one-third through the lead. The lead sheath can then easily be broken off at this point by bending it backward and forward, after which it can be easily pulled free of the cable. In cold weather or if the cable has been bent or twisted the sheath may not come off easily. In that case heat the end to be pulled off with a candle. This will soften the wax in the cable and allow the lead sheath to be removed easily.

If the cable has a braided covering, the latter can be removed by making a slit, by means of a sharp penknife, lengthwise from the end of the cable to the marked point. Avoid cutting the insulation of the conductors. After this cut has been made, the braiding can be peeled off easily and removed with a pair of cutters. A wrapping of lacing twine should then be made around the cable where the braiding ends to prevent any further loosening of the insulation at that point.

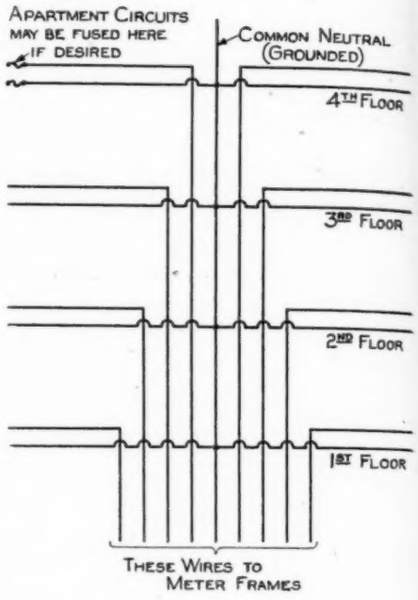
After the covering has been removed from the cable, the wires should be formed, fanned out and sewed up so that they will have the proper shape for connecting to the terminals. This is best accomplished by means of a small wooden board. The marking of the board depends entirely upon the location of the terminals to which the wires are to be connected.

Common Neutral Saves Wire and Conduit

The various central stations have their own rules and regulations respecting the installation of service connections for light and power in buildings, which the electrical contractor must abide by in the performance of his work. For example, in the case of an apartment house, some companies permit the meters to be placed in the various floors in the tenants halls, while other companies require that all the meters be located in the cellar, which of course necessitates a considerable run of wire and conduit. In this latter case a great saving may easily be effected by a simple method, which has proved entirely satisfactory.

This method employs a common neutral which is of sufficient capacity to take the place of the several neutrals, or grounded conductors which would otherwise be necessary. The layout for a four story apartment, two apartments per floor is given in the accompanying wiring diagram which shows a two wire system feeding each apartment. Note that only one wire runs from the apartment down to the meter service and the other is tapped off the common neutral, which of course is grounded.

In this case only nine wires and one conduit run are necessary, whereas otherwise sixteen wires and two conduit risers would be necessary, as the National Electrical Code permits only nine wires in any conduit.



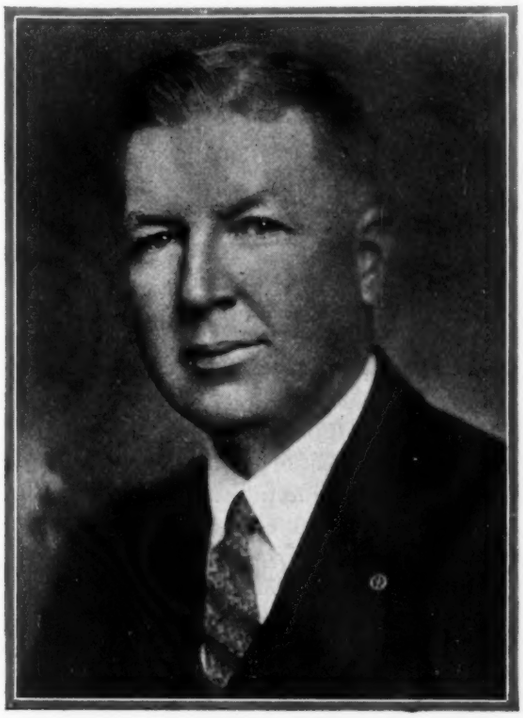
The common wire being the neutral and grounded, of course must not be fused, but both wires of the final two wire branch circuit may be fused if desired. It is understood that this common neutral must always be placed in the same conduit with the other wires, as it forms a part of the various circuits.

In calculating the size of the neutral, a "diversity factor" is suggested in the interest of economy, when the total connected load exceeds 70 amp. The following table of "diversity factors" has been found to answer the purpose nicely.

DIVERSITY FACTORS FOR FIGURING COMMON NEUTRAL SIZES

Connected Load per Side Amperes	Diversity Factor
1 to 70	100%
71 to 150	75%
151 to 300	60%
301 and up	50%

Several of these equipments have been installed in and around the vicinity of New York City and have been quite satisfactory, but it is strongly suggested that the inspection department having jurisdiction be consulted before adopting this practice.



H. G. Street, Memphis

THE chances are that if his brother hadn't been a practical electrician, H. G. Street would now be interested in St. Louis hardware instead of being one of the leading contractor-dealers of Memphis, Tennessee. Born at Corinth, Mississippi, in 1875, Mr. Street divided his time between school and his father's hardware store until he was eighteen, when scholastic things were left behind and he devoted his entire time to the family business. A few years later, he went to St. Louis and, during the following ten years was a salesman for the Simmons Hardware Co. of that city. About that time he grew pretty tired of traveling and in 1906, with his brother, R. A. Street, a practical electrician, incorporated the present Memphis Electric Company. Thereafter, there was no variety of electrical work the Street brothers passed by. Everything from patching up elevators to talking the wonders of the then new Tungsten lamp, then selling at $2.10 each, was welcome and the business prospered. During the war, H. G. Street bought his brother's interest in the Memphis Electric Company and began to specialize in lighting fixtures, time and material wiring, and merchandise sales. He has, however, found time to serve as a member of the Memphis Chamber of Commerce and Rotary Club, as well as The Society for Electrical Development; the Memphis Electric League, of which he is Treasurer; and the Association of Electragists, International. For twenty years he has been an active and enthusiastic Electragist.

Electragists You Should Know

F. E. Robinson, Charlotte

ONE of the outstanding figures in the electrical business in North Carolina is F. E. Robinson, not only because he is a former president of the North Carolina Association of Electrical Contractors and Dealers but because he has served the industry in so many capacities, and he is familiar with the problems of all. Mr. Robinson was born on a farm in Mecklenburg County, N. C., and at the age of nineteen began his business career with the Southern Bell Telephone Company, being employed in the construction department. This work took him at various times to most of the states below the Mason-Dixon line and he came to know and to recognize the electrical needs of the South. In 1905 he was transferred to the Charlotte office of the company, where he was to be permanently located, but after about two years with the telephone organization there, he resigned to take a position with the City of Charlotte as electrical and business inspector. He carried on the inspection work of the city for several years and then, believing that contracting offered both a chance for public service of an unusual kind and for personal reward, he resigned from his municipal position and entered the wiring business. In 1919 he incorporated the business under the name of F. E. Robinson & Co., Inc. Each year since it was founded the business has shown a gratifying increase and recently the company moved into a new building especially erected to serve as its headquarters. The new building has very elaborate show rooms and modern equipment for the lighting fixture and appliance departments. Mr. Robinson is a vice-president of the City Industrial Bank of Charlotte, and represents the electrical trade in the Rotary Club of Charlotte.

The Electragist

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The Dangerous Element

"The dangerous element in any industry" Gerard Swope, president of the General Electric Company, stated recently before a group of prominent electrical manufacturers, "are those who do not know their costs."

People have a way, he pointed out, of remembering low prices quoted by manufacturers in their competitive efforts, and it is difficult to overcome these impressions long afterwards.

If one were to have closed his eyes, he might easily have thought he were at a meeting of contractors, rather than manufacturers. It seems that the contracting industry is not alone in its unbusinesslike practices.

However, Mr. Swope's remarks though directed to manufacturers have a meaning for contractors. The man who, unmindful of his costs, quotes too low a price for wiring does two things that are hard to live down: First, he makes it difficult for another contractor to get work at a reasonable price, and second, he makes it difficult to get a better price himself after he learns his true costs.

Closing the Year

There are certain things, generally disagreeable, that people feel they must do at a certain time each year, like changing flannels, cleaning house, taking sulphur and molasses, etc. At the end of the year many business men seem to feel that they must turn their organization upside down and inside out, taking inventory, making up a profit and loss statement, opening a new set of books and what not.

What makes a contractor-dealer believe that he can remain in ignorance about his business all year except for one day, December 31?

And what is the delicious surprise that he so carefully guards for that great day? Less profit than he thought he had made—or perhaps a loss? Shrinkage of inventory? Accounts receivable grown musty with age, and finally thrown into the waste basket?

Just like Christmas time when we were kids speculating what we were going to get in our stocking—how wonderful it must be waiting for a whole year, and then learning such wonderful secrets.

If, however, one has outgrown the Santa Claus stage, he might decide to know the condition of his business all the time, and get a set of books or an accounting system that would keep him out of a 364 days' suspense each year. Also, he might budget his business, by deciding to do so much business each month (a little more than that month last year) and spend a certain percentage, and no more, handling that business—and then live within that budget.

A Small White Card

Two or three weeks ago a small white Library Bureau card was issued by Underwriters' Laboratories. It was the test card on Rome X.

The card is presented as a statement of fact. It states that the Code does not permit the use of such a material, but instead of stopping there, the card concludes with a statement that the "material has been examined and tested by the Underwriters' Laboratories, and found to comply with tentative specifications for material of the class."

As was to be expected the manufacturer has taken advantage of this unfortunate disregard by Underwriters' Laboratories of the erroneous impression this card would create in the minds of most people.

The Underwriters' Laboratories serve a useful purpose in the electrical industry. There have been times, however, when faith in their ability to function properly, as set up at the present time, has been severely shaken.

The electrical industry needs an institution such as Underwriters' Laboratories; but this institution must have a definite and orderly procedure administered by executives whose judgment will not permit the recurrence of a similar situation. We need at the helm of such an institution men who will preserve the integrity of the Laboratories from encroachment by self-interested manufacturers, but at the same time, we need men who will have the ability to keep an open mind and not reach premature and ill-advised conclusions.

The manufacturers supply the funds to enable Underwriters' Laboratories to do their work. This, however, does not give the manufacturers any right to dictate to the Laboratories what they shall and shall not approve. Neither does it give to the Laboratories the right to be the advocate

for any material presented to them which does not meet with the approval of other manufacturers. The executives of such an institution must bear themselves as judges, not as attorneys.

The Laboratories in its corporate set up, it is true, is a private corporation. Nevertheless, its work is of such a nature and its effect on living conditions so definite, that its pronouncements have a great public influence.

The manufacturer of Rome X is not only taking full advantage of this white card, but flushed with its victory, it is flouting the Electrical Committee and the National Electrical Code. In a letter to its distributors, this manufacturer states "we contemplate also that the bars will be dropped by the inspectors who feel they are capable of dictating just how Rome X should be put in."

No matter what may be said or implied by any one, our readers must remember this: *The National Electrical Code does not permit the use of unarmored assemblies. The Laboratories has not approved, nor has it any right to approve such assemblies.*

The Electrical Committee is the only body that has the right to lay down installation rules. This body will meet in February, at which time, it is reasonable to suppose, some fairly definite action will be taken with regard to installation rules governing the use of unarmored assemblies. Until that time such material is taboo in any place operating strictly in accordance with National Electrical Code rules.

An Unnecessary Waste

America stands for high wages, and rightly so, because we as a country believe in improved living conditions. On the other hand, America must reduce the cost of labor.

There is no more appalling waste in all the world today, than the waste of labor. The waste of labor is unlike almost any other industrial waste because it can never be reclaimed.

Within the past few weeks both President Coolidge and Secretary Hoover have pointed out that since the war, wholesale prices have been greatly reduced, but labor continues to gain.

In the electrical construction industry, we know this to be a fact. Wire, conduit, lamps, and almost all other electrical materials and supplies are lower today than they were during war times. Labor is higher.

These are facts, and, inasmuch as labor bears about as large a proportion to the cost of a job as material, it behooves electrical contractors to bring the cost of labor down not by reducing wages, but by reducing labor waste.

Would one think of throwing away thirty or forty sockets in every package? or a few lengths of pipe? or fifty feet of wire on every job? Ridiculous, of course! But that is exactly what contractor after contractor is doing with an equally costly commodity—labor.

At the present time the public is paying for a large part of this waste. However, when a sufficient number of contractors learn how to reduce labor waste to a minimum it will be found that the less efficient will not be able to compete.

How often do we, even now, hear that certain contractors are taking jobs below cost. Whose cost? Why the costs of the fellows who did not get the job.

In far too many cases this is true. It is regrettable, but it is a fact nevertheless. On the other hand, some of these low bidders make a profit without extras. They know how to reduce labor cost.

How often do we hear a contractor bemoan the fact that the labor on a certain job exceeded his estimate by a large amount? Why? Wasn't this estimate right? In some cases it wasn't, but in a large number of cases his labor was larger than he estimated because it was wasted.

There are so many ways that labor can be wasted. The consulting engineer may make a mistake and the work have to be ripped out, and put in over. That is a waste of labor that might be doing something else. Of course, the consulting engineer may admit the error and tell the contractor to bill him for the cost of the error, but how many such bills are ever presented?

The general contractor can, and often does, cause a great deal of labor loss. No way that we know has as yet been found to make him pay for this loss, so that the public has to pay because a covering factor is a part of the estimate.

The contractor's office force may make errors in purchasing that cause job delays and later overtime.

The supervising force may be negligent, and it is in this department that the greatest opportunity for improvement lies. Following are a few causes of such waste:

Men hanging around the shop because work has not been laid out in advance.
Time going from job to shop, and back to another job.
Not enough or right supplies delivered to a job.
Material improperly distributed on the job, causing unnecessary walking back and forth by men.
Inadequate and indefinite plans.
Material arriving late because of delays by manufacturer or by contractor.
Unqualified foreman causing poor morale and disorganization.
Mishandling of materials on the job causing injuries thereto, which show up after the job is installed and necessitate replacement.
Loss of time and morale because of accidents.
Lack of proper tools.
Defects in the work which the inspector will not pass, necessitating replacement.
Too many men on the job.
Incompetent mechanics.
Lack of incentive.

This condition is not peculiar to electrical contracting. It is a condition of American industry that grew upon us probably because labor was plentiful and cheap.

Now labor is not plentiful and it is not cheap. The inventive genius of the world is at work to build machines and tools that will reduce the labor cost per item of manufacture or building operation—and then the labor that is saved at the spigot is wasted at the bunghole, through indifference.

Association of Electragists
INTERNATIONAL

PRESIDENT, Joseph A. Fowler
118 Monroe Ave., Memphis, Tenn.

SECRETARY AND TREASURER, Laurence W. Davis,
15 West 37th Street, New York City.

EXECUTIVE COMMITTEEMEN

Eastern Division
W. Creighton Peet,
70 East 45th Street.
New York City

Mountain Division
E. C. Headrick,
87 Broadway,
Denver, Colorado

Southern Division
J. A. Fowler,
118 Monroe Avenue,
Memphis, Tenn.

Eastern Canadian Division
R. A. L. Gray,
85 York Street,
Toronto, Ont.

Great Lakes Division
E. McCleary,
2470 Grand River Avenue, W.,
Detroit, Mich.

Western Canadian Division
J. H. Schumacher,
187 Portage Avenue,
Winnipeg, Man.

Central Division
A. Penn Denton,
512 South West Blvd.,
Kansas City, Mo.

Open Shop Section
J. F. Buchanan,
1904 Sansom Street,
Philadelphia

Pacific Division
C. L. Chamblin
687 Mission Street
San Francisco, Calif.

Union Shop Section
L. K. Comstock,
21 East 40th Street
New York City

AT LARGE
W. A. Jackson
37 West Van Buren St.
Chicago, Ill.

COMMITTEE CHAIRMEN

Architects and Engineers (including Jurisdictional Awards)
E. McCleary
2470 Grand River W., Detroit, Mich.

Code
A. Penn Denton,
512 So. W. Blvd., Kansas City, Mo.

Conventions and Meetings
Joseph A. Fowler
118 Monroe Ave., Memphis, Tenn.

Cost Data
J. H. Schumacher
187 Portage Ave., Winnipeg, Man.

Credit and Accounting
J. F. Buchanan
1904 Sansom St., Philadelphia, Pa.

Electragists' Data Book
E. C. Headrick
87 Broadway, Denver, Colo.

Legislation
J. F. Buchanan
1904 Sansom St., Philadelphia, Pa.

International Relations
R. A. L. Gray
85 York St., Toronto, Can.

Liability Insurance
Joseph A. Fowler
118 Monroe Ave., Memphis, Tenn.

Membership
C. L. Chamblin
687 Mission St., San Francisco, Calif.

Publication
L. K. Comstock
21 East 40th St., New York City

Radio
E. C. Headrick
87 Broadway, Denver, Colo.

Standardization
W. A. Jackson
37 West Van Buren St., Chicago, Ill.

Trade Policy
(Covering Manufacturers, Central Stations, Jobbers and Merchandising)
W. Creighton Peet
70 E. 45th St., New York City

U. S. Chamber of Commerce
L. K. Comstock
21 E. 40th St., New York City

Past Presidents of the National Electrical Contractors' Association

Charles L. Eidlitz.....1901-1903
E. McCleary 1903-1905
James R. Strong.....1905-1908
Gerry M. Sanborn.....1908-1910
*Marshall L. Barnes.....1910-1912
Ernest Freeman 1912-1914
*Deceased
John R. Galloway.....1914-1916
Robley S. Stearnes.....1916-1918
W. Creighton Peet.. 1918-1920
James R. Strong.....1920-1925

CHAIRMEN AND SECRETARIES OF STATE ORGANIZATIONS

State	Chairman	Secretary
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Alabama:	J. R. Wilcox 2017 First Ave. Birmingham	D. B. Clayton Am. Trust Bldg., Birmingham
California:	H. H. Walker Los Angeles	Northern Division Edward Martin 182 Fifth St., San Francisco Southern Division C. J. Geisbush 610 Cotton Exchange Bldg., Los Angeles
Connecticut:	N. B. Fitch New Haven	Wilbur M. Peck Box 440, Greenwich, Conn.
Florida:	Preston Ayers Orlando	Charles E. James Fort Pierce
Illinois	Joseph R. Downs 209 Federman Bldg. Peoria	L. B. Van Nuys 238 S. Jefferson Ave., Peoria
Indiana:	George H. Smith 115 S. College Ave., Bloomington	Ralph Brassie Lafayette
Iowa:	R. Honneger 516 W. 3rd St. Des Moines	C. E. Gourley Cedar Rapids
Kansas:	R. M. Sutton 123 N. Market St., Wichita	Charles Dalrymple Wichita
Louisiana:	Robley S. Stearnes 624 Carondelet St., New Orleans	

State	Chairman	Secretary
Maryland:	A. C. Brueckmann Keyser Bldg., Baltimore, Md.	G. S. Robertson 417 Park Bk Bdg., Baltim're
Michigan:	W. F. Fowler c-o Barker-Fowler Electric Co., Lansing	E. P. Blackman c-o Motor Shop Battle Creek
Missouri:	Charles J. Sutter 1227 Pine St., St. Louis	G. E. Haarhaus 6804 Minnesota Ave., St. Louis
Mississippi:	W. F. Johnston Meridian	A. H. Jones McComb
New Jersey:	Henry M. Desaix Paterson	Robert Beller Newark
New York:	A. Lincoln Bush New York City	H. F. Janick 235 Berlin St., Rochester
North Carolina:	N. L. Walker Raleigh	F. E. Robinson Charlotte
Ohio:	C. L. Wells Akron	O. A. Robins 1517 Franklin Ave., Columbus
Pennsylvania:	Floyd L. Smith 250 Wyoming Av., Scranton	M. G. Sellers 1202 Locust St., Philadelpha
Tennessee:	J. G. Cason 303 W. Church St. Knoxville, Tenn.	J. A. Fowler 118 Monroe Ave., Memphis
Texas:	T. L. Farmer 1809 Main St., Dallas	J. W. Read 715 Capitol Ave., Houston
Wisconsin:	L. W. Burch 202 E. Wash'n Ave., Madison	

List of Local Associations

STATE AND CITY	LOCAL SECRETARY	STREET ADDRESS
ALABAMA		
Birmingham (C)	J. R.Wilcox	2017 First Avenue
ARKANSAS		
Fort Smith (C)	Edward Ryan	Ft. Smith Lt. & Trac. Co.
CALIFORNIA		
Fresno (C)	Clyde L. Smith	1162 Broadway
Long Beach (L)	V. Ringle	So. Cal. Edison Co.
Los Angeles (C)	Helen I. Mikesell	1009½ S. Hill St.
Oakland (C)	Laurence R. Chilcote	Hobart & Webster Sts.
Sacramento	L. W. Sherman	910 Ninth Street
San Francisco (C)	E. E. Browne	522 Call Building
COLORADO		
Colorado Springs (C)	Matt Whitney	208 N. Tejon St.
Denver (C)	Thomas W. Nixon	615 Fifteenth Street
Pueblo (C)	E. F. Stone	So. Colorado Power Co.
CONNECTICUT		
Hartford (C)	A. A. Angello	473 Park Street
Waterbury (C)	D. B. Neth	107 West Main Street
DIST. OF COLUMBIA		
Washington (L)	R. W. McChesney	Munsey Building
FLORIDA		
Jacksonville (C)	W. H. Secrist	c/o Bay-Secrist Elec. Co.
Miami (C)	E. A. Robinson	118 N. W. First Ave.
GEORGIA		
Atlanta (C)	B. K. Laney	75 Marietta Street
Savannah (L)	Sylvan M. Byck	Byck Electric Co.
ILLINOIS		
Chicago Electrical Contractors' Association	J. W. Collins	160 No. LaSalle St.
Master Elec. Contractors' Association	F. J. Boyle	175 W. Washington St.
Decatur (C)	Earl Weattherford	114 East William St.
Peoria (C)	L. B. Van Nuys	238 So. Jefferson St.
Rockford (C)	Donald Johnson	106 North Second St.
Springfield (C)	A. D. Birnbaum	916 West Cook St.
INDIANA		
Gary (C)	A. B. Harris	570 W. Washington St.
Indianapolis (L)	R. E. Snyder	704 No. Alabama St.
Terre Haute (C)	C. N. Chess	523 Ohio Street
IOWA		
Davenport (C)	Louis F. Cory	510 Brady Street
Fort Dodge (C)	J. A. Paul	21 South 12th Street
Sioux City (C)	E. A. Arzt	211 Fifth Street
Waterloo (C)	R. A. Cole	Cole Bros. Elec. Co.
KANSAS		
Salina (C)	G. R. Pizarro	146 So. Santa Fe St.
Wichita (C)	P. W. Agrelius	Wichita
KENTUCKY		
Lexington (C)	J. H. Brock	235 East Main St.
Louisville (C)	C. L. W. Daubert	921 South Third St.
Paducah (L)	K. H. Knapp	c-o Paducah Electric Co.
LOUISIANA		
New Orleans (C)	I. G. Marks	406 Mar. Bk. Bldg.
Shreveport (C)	R. L. Norton	620 Marshal Street
MARYLAND		
Baltimore (C)	George S. Robertson	417 Park Bank Bldg.
MASSACHUSETTS		
Haverhill (C)	H. W. Porter	14 West Street
Malden (Medford, Everett and Melrose) (C)	H. J. Walton	c-o Malden Electric Co.
Springfield (C)	A. R. Tullock	11-12 Court House Place
Worcester (L)	John W. Coghlin	259 Main Street
MICHIGAN		
Detroit (C)	N. J. Biddle	112 Madison Ave.
Grand Rapids (C)	T. J. Haven	1118 Wealthy St., S.E.
Saginaw (C)	E. T. Eastman	209 Brewers Arcade
MINNESOTA		
Duluth (L)	Morris Braden	c-o Minn. Power & Light Co.
Minneaoplis (C)	W. I. Gray	209 Globe Building
MISSOURI		
Kansas City (C)	A. S. Morgan	4 E. Forty-third St.
St. Louis Electragists' Ass'n (C)	W. F. Gersner	120 No. Second St.
Electric Employers' Association (C)	G. L. Gamp	Wainwright Bldg.
NEBRASKA		
Lincoln (L)	George Ludden	1329 N Street
Omaha (L)	Isreal Lovett	c-o City Hall

(C) designates exclusively Contractor-Dealer organization.
(L) designates an Electrical League.

STATE AND CITY	LOCAL SECRETARY	STREET ADDRESS
NEW JERSEY		
Long Branch (C) (Asbury Park and Red Bank)	Austin Hurley	Campbell Ave., Long Branch
Newark (C)	John Caffrey, Jr.	435 Orange Street
Paterson (C)	R. Marshall	479 Market Street
Philipsburg (See Lehigh Valley, Pa.)		
NEW YORK		
Brooklyn (C)	H. F. Walcott	58 Third Avenue
Jamestown (C)	Henry M. Lund	309 Main Street
Nassau-Suffolk (C)	Henry T. Hobby	55 Front Street, Rockville Centre, L. I.
New York City Section No. 1 (C)	M. J. Levy	70 East 45th Street
Independent (C)	Albert A. A. Tuna	127 East 34th Street
Metropolitan (C)	George W. Neil	96 Beekman St.
Rochester (C)	Theo. T. Benz	278 State Street
Schenectady (C)	Richard Spengler	421 McClellan Street
Syracuse (C)	Fred P. Edinger	802 East Water St.
Utica (C)	W. C. Ballda	228 Genesee Street
Yonkers (C)	Louis Mayer	485 South Broadway
OHIO		
Akron (C)	E. C. Rishel	540 East Avenue
Canton (C)	H. A. Hastings	301 New Vickery Bldg.
Columbus (L)	Ernest A. Sims	37 East Main Street
Dayton (C)	Clarence Carey	1107 South Brown St.
Marion (C)	O. H. Cornwell	461 W. Center Street
Massilon (C)	F. D. Mossop	c-o Mesco Electric Co.
OKLAHOMA		
Pawhuska	C. G. Sego	Pawhuska
PENNSYLVANIA		
Allentown (see Lehigh Valley)		
Bethlehem (See Lehigh Valley)		
Catasaqua (See Lehigh Valley)		
Chester (C)	W. H. McMillan	12 West Third Street
Du Bois (C)	C. E. Blakeslee	12 E. Long Avenue
Easton (See Lehigh Valley)		
East Stroudsburg (See Lehigh Valley)		
Emans (See Lehigh Valley)		
Hellertown (See Lehigh Valley)		
Lehigh Valley (C)	A. W. Hill	Main and Market Sts., Bethlehem
Northampton (See Lehigh Valley)		
Palmerton (See Lehigh Valley)		
Philadelphia (C)	M. G. Sellers	1202 Locust Street
Pittsburgh (C)	Fred Rebele	1404 Commonwealth Bld.
Slatington (See Lehigh Valley)		
Wilkes-Barre (L)	Ambrose Saricks	25 No. Main Street
SOUTH CAROLINA		
Charleston (L)	J. P. Connolly	141 Meeting Street
SOUTH DAKOTA		
Sioux Falls	Harry Sedgwick, Pres.	Sioux Falls
TENNESSEE		
Chattanooga (L)	P. W. Curtis	725 Walnut Street
Knoxville (L)	Jerry G. Cason	303 West Church St.
Memphis (L)	J. J. Brennan	12-16 So. Second St.
Nashville (C)	J. T. Shannon	c-o Electric Equip. Co.
TEXAS		
Beaumont (C)	J. A. Solleder	Houston & Bolivar Sts.
Dallas (C)	P. B. Seastrunk	2032 Commerce St.
Houston (C)	J. W. Read	715 Capitol Avenue
UTAH		
Ogden	B. Kristofferson	2249 Washington Ave.
Salt Lake City (C)	C. Louis Collins	215 Kearns Bldg.
VIRGINIA		
Lynchburg (C)	J. L. Fennell	c-o Fennell & App
Norfolk (L)	K. D. Briggs	227 Arcade Bldg.
WASHINGTON		
Seattle (L)	P. L. Hoadley	Seaboard Building
WISCONSIN		
Green Bay (C)	V. E. Grebel	531 S. Broadway
Madison (C)	Otto Harloff	602 State Street
Milwaukee (C)	R. H. Grobe	1604 Wells Street
CANADA		
Montreal (C)	George C. L. Brassart	674 Girouard Ave.
Vancouver (C)	James Hart	323 B. C. Electric Bldg.
Winnipeg (C)	Sydney F. Ricketts	76 Lombard Street

NOVEMBER ACTIVITIES

Chattanooga Greets Tennessee Electragists in Session

HISTORIC old Chattanooga made the Electragists of Tennessee welcome on November 6 and 7 when the Association met for the Fourteenth Annual Convention in the state. It was estimated that almost a hundred visiting representatives attended the opening session at the Hotel Patten to hear the welcome of E. L. Scott, retiring president.

Following the routine business, Joseph A. Fowler, President of the Association of Electragists—International, addressed the meeting and was followed, before adjournment, by Arthur P. Peterson and C. R. Wright. The delegates were guests of the Mills S. Lupton Supply Co. at luncheon after which the historical points of the city were visited until the Southern Electric Co. dinner at night.

The second day of the convention opened with a report of the Tennessee Electragists Legislative Committee by its chairman, W. R. Herstein. The speaker deplored the inertia of the average contractor who, he contended, expects laws to be passed and problems solved for him without any show of interest or activity on his part. Following addresses by I. L. Faucette, for the jobbers; and H. B. Whiteman for the central stations, J. T. Shannon discussed the outlook for 1926. Committee reports followed and the following officers were elected for the year to come:

President, J. G. Casson; vice presidents, R. L. Clift, J. T. Shannon, and William A. Jewell; secretary-treasurer, Joseph A. Fowler. It is interesting to note in this connection that Mr. Fowler enters upon his fifteenth consecutive year in his position.

The delegates were entertained at luncheon after the final session by the American Lava Corporation, while in the evening the convention came to an end with the annual dinner of Tennessee Electragists held this year at the Chattanooga Golf and Country Club.

Adopts Uniform Ordinance On All-Metal Basis

An interesting electrical ordinance has just been adopted by Fort Pierce, Fla. It is virtually the Uniform Electrical Ordinance with an "All-Metal" provision that extends beyond the boundaries of the city. Service is from a municipal plant and the ordinance provides that the plant will not be connected to any building outside the city limits unless wired in accordance with the city ordinance.

South Dakota Meeting at Huron

Practically all sections of South Dakota were represented on October 21 when the regular quarterly convention of the state Electragists was held in Huron. President Harry Sedgwick was present, when the morning session was opened at American Legion Hall, and, following routine business, he impressed on those present that it was important for the Attorney Generals of other states to be consulted with regard to prospective laws for the protection of both the public and contractors of South Dakota.

Following a luncheon given to the Electragists present by the jobbers of the state, uniform city ordinances were discussed and E. M. Lathrop reported for the Trade Policy Committee. Arthur P. Peterson, field representative of the Association, spoke in the afternoon on a plan to hold a state and local conference day immediately before the next West Baden convention. Representing jobbers of South Dakota, Patrick Ronan of the Tri State Electric Co. paid a distinctly complimentary tribute to the business practices and ethics of Electragists in the state. The convention closed with the choice of Mitchell for the January 27 convention in the new year.

Tennessee Electragists at the Chattanooga Convention

California Members at Lebec Meetings

The Southern Division of California Electragists met for an enthusiastic convention on October 16 and 17 at Lebec. One hundred and forty-five people arrived in time for the first meeting and the hotel accommodations were taxed to care for the members and their guests.

The first session, which was open to members only, was devoted to a resume of West Baden as reported by C. J. Heisbush and Walter Norton. Especially enthusiastic was the reception of the report of the Trade Policy Committee which was immediately given a vote of indorsement by the Southern California Division members.

On the second day, the morning meeting was given over to a report of the merchandising Committee. This session was attended by representatives of the Southern California Edison Company and the San Joaquin Light and Power Company. The latter company, through its representatives, later suggested establishing a permanent bases of contact with Electragists of the Southern Division and definate plans, to this end, were made before the close of the convention.

The final business session opened with the discussion of an optimistic paper presented to the convention by the combined electrical supply jobbers of Los Angeles and this cooperative action was well received by those present. The convention closed with the disposal of the usual business routine.

At the banquet in the evening speeches were dispensed with. During the ball which followed, however, prizes for the various in-door and athletic activities, which had been an agreeable feature of the Lebec meetings, were distributed to the skillful and fortunate. The convention was considered by all a complete success in every way.

Many Want Red Seal Licenses

Word comes from The Society for Electrical Development, Inc., that four new leagues have recently been granted licenses by that organization. In the latter part of October, licenses were granted to the Electrical League of Colorado and, in a neighbor state, Oklahoma, to The Electrical League of Tulsa. This progress was followed early in November by the Memphis Electric League and the Electrical League of Youngstown. These four cover a population of 670,926, estimated from the 1920 census.

Since March, 1925, The Society for Electrical Development has distributed 15 new licenses, covering 410 communities, and with an estimated 6,132,141 population. At the present time no less than 43 new leagues are under consideration. Of these, 12 are said to be about to receive licenses from the society.

Some idea of the growing confidence in the Red Seal Plan may be gained from the fact that Rochester now has 65 Red Seal electric homes, Pittsburgh 53, Detroit 39, Syracuse 34, Hudson Valley 30, Louisville 14, Buffalo 12, Grand Rapids 7, and St. Paul 2. Toronto is approaching the 800 mark and, on September 1st distributed a list of 197 builders who had, in one or more homes, installed Red Seal jobs. Included in the list were 59 builders who had signed an agreement with the League to make a Red Seal home of every one they build from then until the end of 1926. Toronto has already begun a direct-mail campaign addressed to the 800 owners of Red Seal Electric Homes, suggesting many ways in which appliances and other forms of electric service can be more conveniently used in Red Seal homes.

Manufacturer and Jobber Awards Interest Contractor-Dealer

S. L. Nicholson

W. R. Herstein

CURIOUSLY enough the McGraw Awards to manufacturer and jobbers made in November, relate to activities in which the contractor-dealer is playing a most important part. The manufacturer's award was made to S. L. Nicholson, assistant vice president, Westinghouse Electric & Manufacturing Company, for his efforts in developing the Uniform Electrical Ordinance. The award to jobbers was made to W. R. Herstein, vice president, Wesco Supply Company, Memphis, Tenn., for his study of the distribution situation which as the citation concluded "was dramatically crystallized on October 1, 1924, when he presented before the annual convention of the Association of Electragists, International, an address on 'Distribution from the Standpoint of the Wholesaler' in which he discussed in detail the functional relationships of the electrical contractor-dealer and the jobber, and the present conditions that surround them with particular reference to the declared merchandising policy of the Electragists."

For many years, Mr. Nicholson as chairman of the Electrical Manufacturers Council, has made every effort to secure a more general adoption of the National Electrical Code. It was large-

ly due to his efforts that the code was made an American Engineering Standard, thereby giving to it a public, rather than a private status. The Uniform Electrical Ordinance is so written, that the latest edition of the Code is always in force wherever that ordinance is adopted.

Two other manufacturers and three other jobbers received certificates of honorable mention as follows:

Clarence A. Bates, electrical engineer, Bryant Electric Company, for his work in the advancement of standardization of electrical supplies.

Thomas E. Barnum, chief engineer, Cutler-Hammer Manufacturing Company, for his legislative and other efforts in the direction of fire and casualty prevention.

John L. Buchanan, president, Wesco Supply Company, St. Louis, for improvements in methods and standards of packing.

Robert H. Scott, assistant to the president, Carter Electric Company, Atlanta, for a system of sales co-ordination between the jobber and the contractor-dealer.

Sylvester C. Greusel, president, G-Q Electric Company, Milwaukee, Wis., for greatly improving the credit standing and prosperity of Milwaukee contractor-dealers through a plan for extending the use of the Standard Accounting System of the Association of Electragists.

William A. Requa, president, Requa Electrical Supply Company, Rochester, N. Y., for helping local contractor-dealers to put by a little money each month to defray expenses of attending annual convention of Association of Electragists.

The Rhode Island League Resumes Meetings

The Rhode Island Electrical League held its first dinner meeting of the year on October 28, at the Turks Head Club, Providence. Incidental to the meeting an exhibit of past and future activities of the local league, as well as a summary of the nation-wide publicity drive for the electrical home.

President Roger Gordon discussed the Red Seal Plan, and anticipated that it would be included in the league plans in the near future. Harry E. Dawson, secretary of the league, reported that the house wiring campaign had brought not only business progress but had led also to much improvement in the inspection situation.

News Notes Concerning Electrical Contractor-Dealers

George Lytle and R. A. Pember have opened the Lytle-Pember Electrical Shop at Ashtabula, Ohio. The new store, which is situated in the New Moose Building is said to be a model as far as stock and modern equipment is concerned.

James and Edward Stewart have announced that they will shortly open an electrical shop in Caro, Mich.

The Superior Electric Co. of Sandusky, Ohio has moved to larger quarters on West Washington St.

In Madison, Wis., the Endres Electric Co. has opened a modern store at 209 West Mifflin Street.

Ted Jordan has established himself in an electrical store of his own in Topeka, Kansas.

The Heitz Electric Co. has been incorporated in Vincennes, Indiana with a capital stock of $25,000. The incorporators are Albert J. Heitz, Carl L. Schaller, John F. Hall, Edward W. Dreiman, and William F. Knirihn.

Harry B. Hoagland who has a store in Elgin, Ill., has opened a branch shop in the Torboss Building, Hebron.

In Battle Creek, Mich., Leon Wilder has announced that he will shortly open the Wilder Electric Co.

The Premier Electric Co. has established a branch store in Hazleton, Pa.

The Ruby Light and Electric Co., Newark, N. J., has opened a new store at 25 New Street.

Nichols & Smith plan an electrical supply store in the Masonic Building, Le Roy, N. Y.

The Sackett Electric Supply Shop recently suffered a loss by fire in Lynn, Mass.

The Elmer H. Henise Electrical Co. of York, Pa., has established themselves in a branch store at 22 Antietam Street, Hagerstown, Md.

The Brilliant Electric Co., Inc., has bought the store of F. T. Rawson in Newark, N. J. This business was established 25 years ago.

An electrical shop will shortly be opened at Delphos, Ohio, by C. A. Bergfeld and W. O'Neill.

A charter of incorporation has been issued to the Duers Electrical Corporation of Thomson, N. Y. Directors for the first year are C. R. Duers, Glens Falls; L. A. Wait, Saratoga Springs, and Joseph Cromie, Schuylerville.

The H. C. Roberts Electric Supply Co. has opened a new branch at Binghamton, N. Y. Other stores of the company are situated in Syracuse, Albany, Philadelphia and Reading, Pa., Washington, D. C. and Baltimore, Md.

C. S. Carter and E. B. Aldrich have announced that they have consolidated their interests in Augusta, Ga., and will do electrical contracting from after the first week in December.

In Beverly Hills, Calif., the L. A. Baker Electrical Co. is now located at 1101 Burton Way.

The Fred Hesser Electric Co. has been established in the Building and Loan Bldg., Carthage, Mo.

Henry G. Neugebauer announces the opening of the Electrical Store in Kene, N. H.

The Electrical Specialty Shop has been established in Augusta, Ga., by T. J. Kearns and D. A. Roberts.

At Minonk, Ill., J. B. Silldorff has opened a modern electrical shop.

The Lauber Electric Co. has moved into its own building in Archbold, Ohio.

Davis Addresses Credit Association

DURING the recent thirtieth annual convention of the Electrical Credit Association, held at the La Salle Hotel, Chicago, Ill., Laurence W. Davis, Secretary and Treasurer of the Association of Electragists—International, was a guest and presented the contractor's view on a number of credit problems. The meeting was held under the auspices of the Central Divisions of the credit association. Discussing the problems of the contractor and the value of his work to the electrical industry as a whole, Mr. Davis said:

"This country is the most highly developed electrically equipped country in the world. Our skyscrapers, our industrial plants, our residences, large and small extending even out into the smallest towns, are electrically wired to a higher degree than those of any other country. And, gentlemen you must admit that this electrical wiring has, in a very large degree, been well done, carefully done, and faithfully done by the electrical contractor. Certainly the group in our industry which has done this job deserves respect.

Contractor Important Factor

"When you consider that the electrical contracting today and in the future will continue to be done by the electrical contractor, who will provide the market and the channel through which the manufacturers and the jobbers will distribute practically all of their wiring materials and supplies, and a large proportion of their equipment, the electrical contractor becomes a factor deserving the most serious consideration and the coordination of all interests to best use his service. The greatest complaint against the electrical contractor may be summed up in these very few words:

"He has failed to make an adequate reward for himself for the services he has rendered.

"Let us analyze some of the reasons why this may be so. In the first place, to use some Irish logic, the fact is not altogether true! Practically every electrical contractor started in business with little or no capital; his total investment in business today represents actually accumulated profit on his business. His seeming lack of profit, because of frequent slowness in payment of his bills, and his limited cash capital is because of the rapid extension of his business, which is usually several steps ahead of his accumulated ability to finance it easily.

"The electrical contractor has some peculiarly difficult problems to solve. He is called upon to place a fixed price in advance upon an unknown quantity of costs. The manufacturer or jobber who makes or handles a certain article knows what thousands, perhaps hundreds of thousands, of that article have cost to make, each one identical in its method of manufacture and distribution.

"Suppose, however, every time a customer came to a jobber he asked for an article which was slightly different from anything ever before produced and which would take weeks and perhaps months to complete in its manufacture, with unknown quantities of labor liable to enter into it and fluctuations on the market price of labor and materials during that period. How would the jobber like to quote a fixed price in advance each time on such sales? And yet, that is practically what the electrical contractor is compelled to do every day in his business.

Price in Advance

"We see then how absolutely essential it is that the electrical contractor be equipped with the most accurate knowledge of the costs of operation based upon broad studies of work done under all sorts of conditions, and that with this estimating data in his possession he needs also a constant and complete record of his own operations from day to day and from month to month to determine his own individual costs of operation and his efficiency or inefficiency as compared with standard costs."

Referring to the value of a definite accounting system for the electrical contractor, Mr. Davis reviewed the development of the past eight years and the interest that contractors are showing in practical accounting methods.

"Eight years ago," said the Electragists' secretary, "through the cooperation of the Electrical Credit Association, the Electrical Supply Jobbers Association, and many other factors in the industry, there was developed, after months of careful study, the Standard Accounting System for electrical contractors and retailers. During the seven years that this system has been in use now 800 systems have been put into operation. The number has increased rapidly during the last year or two. Years of study and use of this system by hundreds of users has proven its value as a practical accounting system to meet the particular needs of the electrical contractors and retailers.

Standard System Used

"The growing use of the Standard Cost Accounting System has developed very interesting experience. Several years ago the Association of Electragists felt that perhaps there were many very small electrical contractors who needed a simple elementary accounting system, and therefore the Association developed its Simple Business Record for such contractors.

"Several hundreds of these business records have been sold to the smaller contractor, but more and more our experience is showing that these users soon discover that such a business record, although it gives them an accurate set of figures, does not give them the information they are seeking.

"The mere producing of a precise and correct financial statement is not the end of accounting. The prime purpose of an accounting system is to furnish to the management of the business certain information which is essential to the proper operation of the business. The real function of accounting is to show the relation of cost, expenses, charges, gross and net profit bear to sales. What was the turnover of stock and capital, how the business stands in relation to its debtors and creditors, what is the relation between net income and capital invested, and finally how all these things compare with similar periods in preceding years.

"And so today, we realize more and more that wherever possible even the comparatively small electrical contractor and dealer should be encouraged to install the Standard Cost Accounting System, and little by little develop its use until he gains the very important information he needs in the guidance of his business. A good accounting system is to the manager of a business what a chart is to the captain of a ship."

Herstein Demands State Legislation

During the recent convention of Tennessee Electragists at Chattanooga, W. R. Herstein made an appeal for proper state legislation for the protection of reputable electrical contractors. A part of his address was devoted to the relative difficulties under which the various branches of the electrical industry do business and it is from this portion that the following is reprinted:

"The electrical industry is now going through an evolutionary period. A few years ago the manufacturer headed the four classifications of our business. Today the central station is at the top. Yesterday the central station officials of your city were local people; the capital invested was local capital. Today the investment is in the hands of a great holding company, representing as great a capital as that of Henry Ford or the United States Steel Corporation.

"Not so long ago your jobber enjoyed individual lamp contracts, and other agreements with many individual public utilities in his territory. Then a holding company absorbed the various local units, and the jobbers contract was with the controlling group. Today these holding companies themselves, have been merged in still larger and more powerful groups, leaving the jobber entirely out of the picture.

"In the days gone by, manufacturers demanded the business of the small central station, who in many cases were dependent upon the manufacturer. Today the manufacturer must carefully solicit that business. The Central Station today needs every little outside help from our industry. The manufacturers are now able to take care of themselves or soon go out of business. While the jobber is not in the fortunate situation of the Central Station or manufacturer, he can strengthen his position in the industry by making himself useful. It is a case of survival of the fittest.

"The contractor-dealer, on the other hand, is the most helpless of all. Yet nobody can perform his function. The central station may go into the merchandising and jobbing business, but it wisely leaves the contracting alone. The contractor-dealer finds himself in a difficult position, hampered by unfair conditions. He is assailed by competition from a class of people who don't know anything about business. We all realize the need for legitimate competition, but unintelligent competition should be restrained.

"The majority of the 1,000 bungalows built in my city this past year were wired by contractors who are now out of business. When trouble develops the one responsible is nowhere to be found. The inspection department suffers materially. In fact no one benefits from this class of competition.

"The merchandising field looked inviting to other people, and manufacturers came demanding distribution of their products. Drug stores, department stores, etc., went into the cheap and off-standard appliance business, because they wanted low prices. The central station saved the day by selling standard goods. The electragist is entitled to protection from those who use his field as a sideline and from unintelligent competition.

"Our laws give protection to other people. You know how the railroads were granting rebates to favored shippers, giving free passes, etc. Then the United States Government stopped it and said the rates must be the same to all. The rate from Atlanta to St. Louis must be the same, no matter what road you travel on. In other words the principal of proper protection has been accepted.

"Then came the farmers. Today the methods employed by the California orange growers are recognized by law. The Clayton Act legalized the attitude of labor unions toward cut wage rates. German exporters were enjoying a big foreign business, because their laws permitted the fixing of prices. American manufacturers were virtually excluded from the foreign field, until the Webb-Pomerene law permitted them to combine for export prices.

"Legalized protection is now a fundamental of American business."

Bureau Denies Battery Recommendations

The attention of the Bureau of Standards has been called to the frequent misuse of its name in connection with the sale of dry batteries for radio receiving sets. Claims have been made, by some dealers and factory representatives, that the superiority of their particular brands of dry batteries has been shown by tests made at the Bureau of Standards.

Tests of batteries, including the dry-cell "A" and "B" batteries for radio use, are made at the bureau in accordance with Government specifications. These tests are made to aid the departments of the Government in the purchase of batteries and to help each manufacturer to improve his product.

The bureau does not publish the results of its tests, nor does it inform any manufacturer of the results of its tests on other manufacturers' batteries. Therefore statements that any make or brand of battery is superior as shown by tests made at the Bureau of Standards are unwarranted.

Underwriters Schedules Up to Contractors

A situation has arisen under the jurisdiction of The New York Board of Fire Underwriters with respect to the payment of reinspection charges in a portion of the state. For some years, a schedule of payments in certain districts outside the city of New York has been somewhat lower than inspection charges in the greater city. There has always been a difference in the two schedules, however, in that the lower schedule required an extra charge for reinspection, in cases where such service was required.

Finding that this charge for reinspection was not entirely agreeable to certain of the contractors, The New York Board of Underwriters eliminated the lower schedule entirely and with it the reinspection charge. Immediately, it became evident that the new plan had opponents.

The underwriters have, therefore, called on the contractors of the counties interested to settle the local difficulty. They have agreed to abide by whatever decision the contractors may reach on the subject.

OBITUARY

James S. Walker, Jr.

James S. Walker, Jr., president of the Walker Electric Company, Salt Lake City, Utah, died suddenly on November twentieth. Mr. Walker has for many years been one of the leaders in the electrical industry and, at the time of his death, was president of the Salt Lake City Contractor-Dealers Association.

New Electragists

The following list of contractor-dealers have made application for membership and been accepted into the A. E. I. since the publication of the last list in the November issue:

ARKANSAS

Little Rock:
Fagan Electric Co.

Fort Smith:
Southern Electric Co.
Hunt Electric Co.
Masters Electric Co.
Edelmann Electric Co.

CALIFORNIA

Bell:
Bell Electric Co.

Los Angeles:
American Elec. Construction Co.
California Electric Co.
L. A. Duncan
R. M. Fry
Golden State Electric Co.
L. A. Electric Contracting Co.
L. A. Electric Works
J. H. Lowe
P. A. Rose
Wilson's Electric Shop

Oceon Park:
D. S. McEwan

FLORIDA

Ft. Pierce:
Geo. F. Case, Elec'l Inspector, City of Ft. Pierce

ILLINOIS

Cairo:
Halliday Rittenhouse Co.

INDIANA

Mishawaka:
Perkins Bros.

IOWA

Sac City:
W. A. Irvine

Sioux City:
Smith Electrical Works

KANSAS

Ft. Scott:
W. J. Nelson Elec. Co.

Pittsburg:
Bixler Electric Co.

MICHIGAN

Ann Arbor:
Washtenaw Electric Shop

Battle Creek:
E. C. Morse & Co.

Detroit:
Kogan Electric Co.

Jackson:
Hodges Electric Co.

MISSOURI

Kansas City:
Magelsen Electric Shop

St. Joseph:
O. K. Electric Co.

NEW YORK

Rochester:
Benjamin Electric Co.
Charles John Martin

Brooklyn:
L. A. Feldman

PENNSYLVANIA

Blairsville:
Geary & Trimble

TENNESSEE

Chattanooga:
Clark Electric Co.

Memphis:
Shelby Electric Co., Inc.
Standard Electric Co.
Wright Electric Co.

WISCONSIN

Milwaukee:
R. J. Franzel

Construction Council Statement

The American Construction Council has frequently, through its various agencies, called attention to the housing situation in various localities. A recent statement, released by Franklin D. Roosevelt on November 25, deals with better construction plans as follows:

The general situation as to housing is such as to call attention forcibly again to the great need for proper planning, sounder financing, and better construction of homes, a condition which the Council has repeatedly pointed out and already done much to remedy through its nationwide campaign for better building. Through this movement for better building, started by the Council several years ago, representatives of all the component parts of the construction industry, from investor, owner or tenant to builder and mechanic, are engaged in one of the most notable cooperative endeavors of a great industry ever witnessed in modern business to deal with its relations to the public.

The Council is happy to state that those efforts are receiving the hearty cooperation of the leading branches of the construction industry, some of which, following its suggestion, have already taken up the problem for careful analysis and treatment from their respective angles. In the last analysis, however, the remedying of conditions demands that the public of the country, assisted by the intelligent leadership of the industry as a whole, must learn the essentials of right construction and then insist that they be put into practice.

The public should be doubly cautious as to the character of construction it accepts for its money. With the gradual overcoming of the postwar shortage and passing of temporary building booms in some localities the return to normal consideration of building values will make structures of inferior quality an increasingly heavy liability. There are evidences in some few localities that the element of caution is already curtailing speculative operations.

Newbery Team Winner of Pennant

The Newbery Electric Corporation Team, Winners of Los Angeles Electric Club Championship

•MANUFACTURING•

A Department Devoted to the Latest Devices Used by the Electrical Contractor and Dealer

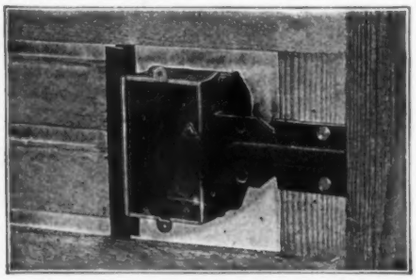
Adjustable Receptacle

A new adjustable canopy receptacle, No. CK-97 has been announced by The Hart & Hegeman Mfg. Co., of Hartford, Conn. Among the features of this receptacle are its 2-in. adjustment for different sizes of canopies, the fact that

no box straps or screws are needed to hold canopies, and the fact that it attaches to 3-8-in. fixture stud or box lugs. There are, moreover, no porcelain rings to loosen and the canopy is rigidly held between two porcelain pieces screwed together.

Appleton Switch Box

Appleton Sectional Switch Boxes with knockouts for loom, armored cable and conduit can now be furnished with lath support and mounting bracket. Two lugs are bent inward on the mounting bracket making it possible to square the box with the joist on which it is fastened and the mounting bracket has nail holes for use in fastening to the joist.



The lath support holds the lath rigidly and prevents the lath from moving during plastering. These boxes have the same features as the regular Appleton Sectional Switch Boxes, are said to be easily ganged and provide an economical means of installation. Manufactured by the Appleton Electric Company, Chicago, Ill.

Wakefield Bracket

Under the trade-name Attachette, The F. W. Wakefield Brass Company of Vermilion, Ohio, is offering a new form of portable bracket. An ornamental clamp, having a felt-covered pad of sponge rubber, fastens firmly by a wing nut to the furniture, and holds a bracket

arm by means of a ball joint. This joint permits the Attachette to be installed on either side, top or bottom. The arm may be upright or pendent as preferred, and it is adjustable at any angle from the surface to which it is clamped. It is available in two finishes, old ivory and bronze.

Beaver Switch Product

The Beaver Machine & Tool Co., Inc., of Newark, N. J., have put on the market a new feed-through switch. This

model is of the longitudinally split type and is housed in the conventional black molded casing.

Boltless Stem

The Appleton Electric Company, Chicago, announces a new "boltless" fixture stem which requires no bolts and is designed time and labor saver. It is only necessary to slip this stem in

place, tighten the locknut, and the support is made rigid. Vibration cannot work it loose. The entire stem is stamped from steel and furnished in galvanized finish only.

Reynolite Tap

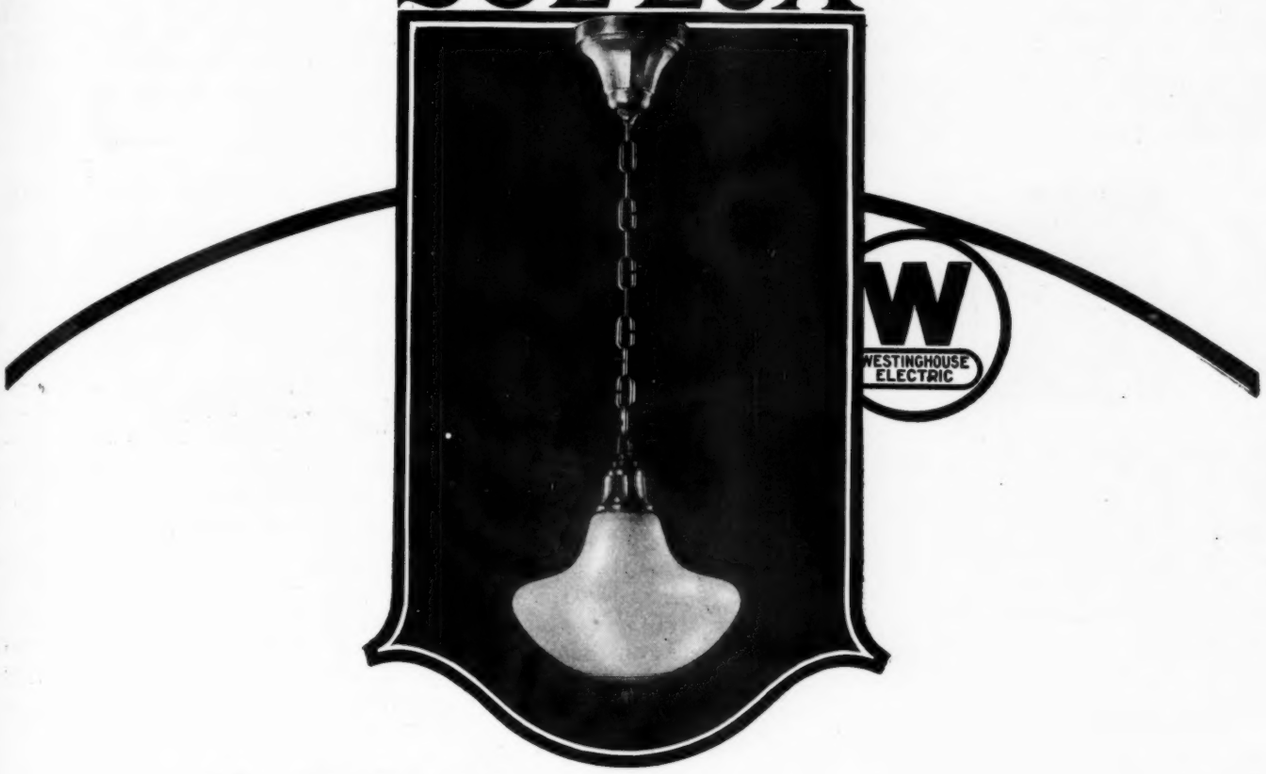
The Reynolds Spring Co., Jackson, Mich., have marketed a straight two-way convertible current tap, especially designed for base outlets. This tap is

small and fits close to the wall. It is adapted for Edison screw receptacles and is quickly convertible into the pin type by removing the special attachment body.

New Snake Puller

J. H. Wittmeyer, Glendale, Calif., has announced a new product, Fillingers Snake Puller. This tool is an aluminum handle for fish tapes and has oil and salt water tempered jaws which work on steel pins. It has been tested to the pulling strength of four men.

SOL-LUX



To Help You Sell the Sol-Lux Luminaire

Besides the prestige gained by identification with a great name we offer you a definite selling plan, complete in every detail, backed by national advertising telling your customers the story of Sol-Lux and by real selling literature and sales letters which will carry your localized message to those to whom you should sell Sol-Lux.

In your territory there is a local Westinghouse merchandising manager, local sales promotion and advertising man, merchandising salesmen and specialists, a jobber, and exceptional service and shipping facilities, all real aids in selling Sol-Lux to your prospects.

This service is YOUR service. Capitalize it.

Use these dealer helps in selling Sol-Lux luminaires for the big installation jobs in your territory. Tell your prospects about the soft, diffused light that radiates from the milk-white globe. Explain how easily lamps are replaced without removing the globe—by simply tilting the cap in the bottom. Show them how low their maintenance costs will be. The globe is dust and bug proof and requires only occasional wiping with a damp cloth.

Get in touch with the Merchandising Division manager in your territory TODAY as the first step in planning a drive for the sale of Sol-Lux luminaires, or write to,

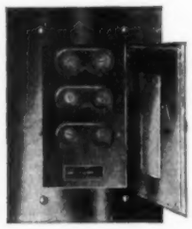
Westinghouse Electric & Manufacturing Company
Merchandising Department South Bend, Indiana
Sales Offices in All Principal Cities of
the United States and Foreign Countries

Westinghouse

X 92101

Trumbull Panel Boards

New residence panel boards have been announced through a catalogue insert by The Trumbull Electric Manufacturing Co., Plainville, Conn. These products can be furnished for two wire branch circuits having three or two wire mains with single fusing or for two



wire mains with double fusing. These panel boards are so constructed that each pair of branch circuit conductors may be led in direct to its particular pair of terminals since a neutral terminal is provided at each individual cutout. The front of these boards is finished in baked enamel.

Manufacturing Notes

The New York interests of the Trumbull-Vanderpoel Electric Manufacturing Company has been taken over by the newly formed firm of Ingham-Gillingham Co., 51 Barclay Street, New York City. This company consists of George V. W. Ingham and George J. Gillingham, both of whom were former members of the Johns-Pratt Co. organization.

The Sun-Ray Lighting Products, Inc., announce that they have appointed as their mid-west distributors the Trans-Continental Electric Co., 156 West Washington Street, Chicago, Ill.

The Denver office of the Western Electric Co. has been moved to 18th and Blake Streets in that city.

Bulletin No. 4000 has been prepared for distribution by the Reliance Electric & Engineering Co., Cleveland, Ohio. This literature deals with the ball and roller bearing motor products of that company.

The Appleton Electric Company of Chicago announce the appointment of H. A. Hammond as their special representative working out of the San Francisco branch, operated by Electric Agencies Company, 655 Minna St. Mr. Hammond will devote his time to the Appleton line in San Francisco as well as Northern California.

The Chicago Fuse Mfg. Co. of Chicago, have moved their Detroit office from the Transportation Building to 429 Wayne Street in that city.

By the first of the year it is expected that the new factory of the Killark Electric Manufacturing Co., St. Louis, Mo., will be finished and ready for occupancy at 3940 Easton Avenue. The building will cover about 25,000 square feet of floor space and a feature of the construction plan is that the entire factory is located on one special floor.

The Connecticut Telephone & Electric Company of Meriden, Conn., announce that they will be represented in New York City by James J. Sheeran and V. F. Harkness, 51 Chambers Street. The former will handle telephones and signal apparatus while the latter will have local charge of installation products.

The Western Electric supply department distributing house of Denver, Colorado, was recently moved from 1425 Curtis Street to new quarters at 1501 Eighteenth Street.

The officers and members of The Electrical Co-operative League in Denver, Colorado, have announced the change of name to the Electrical League of Colorado. The same officers will continue, however, and the headquarters of the league will remain at 402 Gas & Electric Building, Denver, Colorado.

H. H. Walker, President of the California Electragists has opened a modern office and warehouse at 1323 Venice Boulevard, Los Angeles, Calif.

An announcement comes from the National Carbon Company that Paul P. Huffard has been elected vice-president and general manager of the company. Mr. Huffard's present advancement places him in charge of all phases of activities of the National Carbon Company and its associated companies, including the National Carbon Company of San Francisco, and the Canadian National Carbon Company, Limited, of Toronto, Canada.

The works and properties of The Electrical Alloy Company at Morristown, New Jersey, have been purchased by the Driver-Harris Company, Harrison, New Jersey. The Morristown plant will be operated as The Electrical Alloy Division of that company.

Movie Films For Lamp Publicity

The Westinghouse Lamp Co. has prepared a moving picture campaign of merchandising suggestions for the dealer. This feature, The Light Brigade, has been made a part of the traveling show of that company, known as the Flying Circus, which is constantly on its way around the country bringing manufacturing and selling details to the attention of dealers.

This moving picture deals in a semi-serious way with methods of keeping the lamp stock of the company on the move. Aside from holding the attention of the audience, the film offers some astonishing statistics on the lamp production of the Westinghouse Lamp Co.

Incidental to a recent showing of the lamp film at the Pennsylvania Hotel, New York, The Industrial Lighting Committee of the National Electric Light Association also exhibited their film, Yesterday and Today, which was prepared to encourage better industrial lighting. Together these two films are interesting examples of the entirely new methods of publicity which may be expected soon throughout the electrical industry in this country.

Consolidation of Wire Manufacturers

The Safety Cable Company, since the acquisition of the Phillips Company of Pawtucket, R. I., has purchased the A-A Wire Company with factory at Harrison, N. J. and sales offices in the Bowery Bank Building, New York City. The Safety Cable Company, with the addition of these plants, has a complete line of wires and cables—paper, lead covered, varnished cambric, telephone, telegraph, submarine, parkway, weatherproof, bare, and practically the complete line of insulated wire. The company states that the individual companies' trade names and high standards of quality will be maintained.